

**THE CONSTRUCTION OF  
KNOWLEDGE  
IN  
SMALL FIRMS**

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# **ABSTRACT**

## **THE CONSTRUCTION OF KNOWLEDGE IN SMALL FIRMS**

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The research reported in this thesis exposes the grounds for knowledge used by twenty individuals employed by one small UK based firm. The grounds for knowledge are part of knowledge epistemology which has received scant attention in business. A significant outcome arising from this study is the multifarious patterns of knowledge construction even within the confines of a small firm. In addition it would appear people issues are highly relevant in supporting knowledge claims in spite of the range of artifacts designed to assist knowledge appropriation.

The twenty individuals, defined as the unit of analysis, represent a significant proportion of the workforce of one small firm. Studies involving participants beyond management and key employees are rare in small firm research. It is valuable to note the contribution made by all participants in response to the research question. From unskilled labourer to trained secretary, all had particular grounds for knowledge. Yet, this particularity does not equate to an isolated personal possession of knowledge. It was found that grounds for knowledge were constructed from a social setting. This may consist of either organised work groups or perhaps of greater significance from organic communities.

The bounded context for this work was a small firm with typical resource constraints. The research data indicates the important influence of the working environment. Of additional significance was the enduring influence of each participant's biography on their personal and social system for knowing what they know.

An emphasis on education was notable from those who had experienced a modest education. Yet, knowledge amounts to more than education as seen in the responses from participants in the context of the eulogised form of a knowledgeable person, defined as a knowledge icon. A template for knowing something as used by a knowledge icon involves change, innovation, discovery and inventiveness.

Personal construct theory contributes to the formation of a suitable conceptual framework and repertory grid technique is foremost amongst the research tools. But the methodology also incorporates a sociological input and the tools are complimented by an original use of a World Wide Web enabled analysis programme.

This work augments the limited literature available in relation to how we know what we know in the workplace and highlights the need for management in small firms to reflect on the different forms of knowing used by their employees.



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# CHAPTER 1

## INTRODUCTION

The aim of this study is to question on what basis knowledge is formed in today's commercial world. It is addressing participants' *work related knowledge* appreciating that there are many types of knowledge (Sparrow, 1998). Its five objectives are as follows: firstly to question on what basis knowledge is formed in the specific context of a small manufacturing firm. Secondly, to provide an inclusive study, acknowledging that the formation of knowledge applies to all employees in a small firm regardless of employee position. Thirdly, to show how small firm employees regard their eulogised form of a knowledgeable person, defined as a knowledge icon, in terms of how a knowledge icon knows what they know. Fourthly, to highlight the construction of knowledge by individuals coexisting as part of a community, that is, drawn from a personal and social perspective. Finally, this study exposes the position of knowledge artifacts in the formation of knowledge in a small firm.

Knowledge is as complex as humanity itself so despite the progress made in understanding certain knowledge traits we still understand very little about the meaning and formation of knowledge in the workplace. This research aims to build upon the work of Tsoukas and Vladimirou (2001), Cook and Brown (1999), Brown and Duguid (1998) and Garud and Rappa (1994) by asking individuals how they as individuals and those within their community know what they know. Assisted by a modified expansion

of repertory grid (Kelly, 1963) this study reveals the discriminations in use by participants in the context of knowledge, themselves and others.

People in industry have found it useful to share the content of their knowledge but have rarely been asked to share their experience of how that content is constructed or appropriated (Tsoukas and Vladimirou, 2001). How can employees be certain that what they consider as work-related knowledge is based on the right kinds of grounds? (Audi, 1998) When employees reflect upon the knowledge of others in their work environment where do they think that knowledge has come from? Is it reliable and justified? By examining the grounds for knowledge claims in the workplace this thesis suggests that knowledge sharing and management practices can be improved.

### *Knowledge has context*

The unit of analysis in this study is a small manufacturing company incorporating many different functions within one location. The first objective stresses the need to look at knowledge formation in relation to the small firm as an organised context (Tsoukas and Vladimirou, 2001). It provides an opportunity for participants to disclose something of their realities, in a sense that knowledge cannot be viewed in isolation from its condition of production and reproduction (Hollway, 1991).

Knowledge is not contained by a wall or a fence with some *fixed* boundary preventing its slippery characteristic. This notion emphasises ‘fixed’ as boundaries of sorts arise with new knowledge and specialist expertise (Brusoni et al, 2001). Yet, knowledge in



particular areas cannot be contained across time. Instead, knowledge is considered to be drawn together by particular communities and has a domain of action (Tsoukas and Vladimirou, 2001). The context is a particular setting and collection of circumstances that contribute to the knowing taking place. Construing knowledge in a bakery is different to that in an insurance brokerage. Knowledge in the classroom is different from knowledge in the workplace.

Questioning knowledge in the workplace has received attention from many large multinational organisations who dominate the subject. Consultancies, software designers and training organisations have been quick to see an opportunity to market off-the-shelf systems to large firms aimed at capturing and distributing their organisational knowledge. In addition, research within large multinationals tends to attract academic communities, but little attention has been paid to small firms. A small firm cannot be regarded as just a little large firm therefore scaled-down large firm management systems and practices are not appropriate. Small firms warrant individual importance due to their distinctive characteristics and their valuable contribution to the world economy. How is management and employee knowledge validation affected by this micro environment of the small firm?

### *Knowledge epistemology applicable to all*

This thesis reveals an engagement with individual employees, all employed by one firm which could be defined as an objective bounded context. Objective in that the firm exists as a recognisable legal and commercial entity uninfluenced by any researcher

engagement and bounded or limited by a functional and social territory. The objective was to define and identify a small firm as unit of analysis whose management would agree to all employees' participation in a research activity.

Knowledge is part of humanity and not solely the domain of select individuals. We all have the innate ability of *knowing* and how we all know objects and subjects varies with who we are and our primary and secondary socialisation (Berger and Luckmann, 1991).

It is customary to consider the scientist as adept in theoretical thinking, testing hypotheses and weighing up evidence (Kelly, 1963). So this study will now consider all employees in a small firm as scientists; also partaking in such scientific undertakings, 'every man is, in his own particular way, a scientist' (Kelly, 1963, p.5).

Yet, how we know what we know is not common to all. This diversity needs exploring and the outcomes highlighted in order that employees and employers can gain from the knowledge present within their organisation. Organisational studies frequently include management as participants and prime beneficiaries of any research undertaken. More studies involving and benefiting all types of employee are needed in order to gain a more holistic understanding of workplaces (Kusterer, 1978). The young administrative assistant, the unskilled immigrant and the general stores person with learning difficulties, 'the little people', are all part of working communities (Boje, 2001, p.9).

In outline, knowledge impacts on all employees and yet inclusive studies on the subject of knowledge in work are limited and insufficient attention has been paid to the 'little people' as part of a working community.

### *Knowledge Icon*

A new role, chief knowledge officer, has crept into business rhetoric, suggesting that certain individuals are particularly adept at knowing who has knowledge critical to an organisation and how to control that knowledge. Based in a small firm, this research chose not to pursue the chief knowledge officer issue as the role was unlikely to be present in many small firms. However, still linked to this concept of a knowledge hierarchy this study was interested in those individuals described here as knowledge icons. That is, when the subject of knowledge in relation to people is raised who would each participant visualise and what could they say about this person? Would a knowledge icon appropriate knowledge in a particular fashion? The objective is to provide a diagrammatic model of perceived 'epistemological warranties' of a knowledge icon. Then small business owners, management and employees may be provided with a template with which to reflect on their own state (Brown and Duguid, 1998).

### *Personal and/or social*

The instance of new knowledge is invariably reduced to the individual and his/her personal knowledge (Boisot, 1998; Nonaka and Takeuchi, 1995; Zuboff, 1988 and Polanyi, 1962). Thus, personal knowledge is determined as the beginning of any knowledge enterprise. Knowledge is portrayed as a reified possession. Yet, we work and live within a social entity with few opting for a solitary existence. We thus need to know more about the formation of knowledge as part of a community. A further objective



therefore questions whether we should begin our knowledge models and frames with personal knowledge and/or social knowledge?

When a new employee joins a firm and offers his/her particular knowledge on a subject their knowledge was not acquired from working alone in an isolated state; it was gained from living and working alongside others. The individuality is displayed in how that knowledge is perceived to fit in a new context, how that knowledge is transferred and its application. Management and employees draw distinctions within a revised collective domain of action (Tsoukas and Vladimirou, 2001).

### *Knowledge Artifacts*

Managers have introduced many artifacts (documentation, spreadsheets, intranet, computer aided design drawings, and system schedules) to the workplace. Artifacts designed to capture what is known and assist in knowledge transmission. Knowledge is thus perceived as involving more than people. It is seen to involve items that either record explicit knowledge or help in dissemination. They are part of a technological knowledge system (Gasset, 1961) which is beyond nature and beyond people's interaction. The objective is to examine how artifacts are construed not in terms of properties of the physical items but in terms of the discriminations that lie solely in participant's interaction with artifacts. Gasset (1961) describes this interaction as the facilities and frustrations pertaining to a technological world.

Limited artifacts used in small firms absorb a substantial portion of the firm's heritage (Lave and Wenger, 1991). Certain artifacts can also be considered as boundary objects across communities, in that they are assigned a particular document descriptor but take on new meaning when they are transferred across communities in a workplace (Star, 1989). As an example, an order for goods from a customer includes a commission calculation for the salesman and delivery details for the despatch department. Or the out of date workplace notice board that is perceived as a task for the administrator but of enormous interest to the unfulfilled colleague who stands reading every word of every notice to avoid returning to their work.

In sum, this study shows how individuals working in a small firm construe artifacts in the context of knowledge within their world. When an employee is asked to consider how he/she knows what they know where do artifacts fit in knowledge formation?

### *Overview of Methodology*

Jankowicz (1991) and Bannister (1981) highlighted a methodology, Personal Construct Theory (PCT) and a method the Repertory Grid Technique (RGT) that seemed appropriate to this research. It is a methodology that aims to minimise the effects of researcher involvement and adopt a 'credulous approach' (Kelly, 1991, p.241) towards the participants in the process. The method is particularly effective in looking at people as individuals living in a socially constructed environment. As a methodology PCT also acknowledges that people can take responsibility for their own way of living.

PCT is a theory that accounts for its own construction and is therefore reflexive (acts upon itself). It is for the people and of the people and therefore everything that takes place in the research should be relevant to both researcher and participant. The only difference between the researcher and the participant is a matter of abstraction. The researcher is attempting to make sense out of the way the participants make sense of their world. In this respect PCT bears some resemblance to ethnography.

### *Summary*

The deconstruction of knowledge was approached from four perspectives using a modified version of Kelly's Personal Construct Theory (PCT) and the tool of repertory grid technique (RGT). Firstly, knowledge was contextualised. It was seen as situated within communities bounded by a small firm. Secondly, as a social subjective activity with knowledge derived from others in the workplace and home environment. Emphasis here is on 'others' and not just an elite group. But a knowledge hierarchy is acknowledged with a particular focus on the perceived warranties of knowledge icons. Thirdly, a personal *and social* dimension avoids the reification of personal knowledge. Finally, it was felt pertinent to include an exploration of artifacts that represent knowledge in this small firm context.



## Outline of Thesis

The literature review addresses knowledge from a philosophical, academic and commercial stance. A historical perspective reveals the maturity of this epistemological debate and an academic research perspective shows what progress has been made to broaden our approach and understanding of new knowledge claims. Commercially, knowledge is considered as a derivative of data and information with the potential to gain competitive advantage. Searching the business domain a select group of writers have opened up the notion of knowledge as a theme pertinent to the future of business.

Writers interested in knowledge in the workplace have concentrated on large firms with a minority providing a sectoral or small firm approach. Expanding on the work that has been situated in a small manufacturing firm a section in the literature review confronts issues pertinent to a small firm context. Within small business research there is some value in a sectoral foci therefore the domain of action is further defined (Sparrow, 1999).

This work highlights the value in wider participation for small firm research. Literature supporting this approach is detailed. The review also draws attention to recent material on communities-of-practice and the on-going debate in relation to personal and social knowledge. Business research that focuses on knowledge has inextricable links with knowledge management. The crusade for knowledge management has been criticised as being merely a re-invention of organisational learning. Thus, both are reviewed and situated within this study.



The methodology chapter outlines an overview of the method also contributing to the development of the conceptual framework and providing a rationale for the selected research approach. The research tools included a pilot study and an in-depth study involving twenty participants from one small firm representing a sample of the complete business. Interviews used repertory grid technique (Kelly, 1963) designed to elicit individuals constructs within a domain of enquiry which is brought up-to-date with assistance from the World Wide Web and an internet accessed analysis programme. Using various roles as elements this research reveals knowledge constructs in relation to *how* each participant knows what they know and how they perceive others also know what they know.

The ‘others’ referred to here range across a spectrum from work colleague to key informant to the owner manager.

Using repertory grid implies an interest in future events rather than dwelling on a person’s biography. Therefore, in line with the original design of repertory grid two elements are given particular consideration. The first is ‘me’ and the second ‘me as I would like to be’.

Participants were also asked to label an element ‘when I say knowledge the first person you think of’ which was then considered in terms of how participants thought this knowledge icon formed knowledge.

The findings chapter details information gathered from each of the participants in the context of knowledge from repertory grid conversations. Information is presented as individual cameos and collectively as a content analysis. This insight into a small firm's knowledge formation illustrates a complex web of perception with people's background (primary socialization) and ability to transfer knowledge as dominant constructs. Questions surrounding ability and access also arise when knowledge is seen in the context of knowledge artifacts.

Findings incorporate a summary profile of a knowledge icon. A diagram illustrates the outcome of this contribution and details the attributes that are contrary to the distinctiveness of a knowledge icon. Finally, in this chapter all constructs in relation to knowledge and people are gathered and viewed from a social context reflecting the company's functional structure and communities of knowledge construction.

The conclusions show a plethora of issues that arise from the notion of knowledge *even within the confines of a small firm*. The individual cameos indicate personal meaning not common to other participants and deviating from the prescriptive collectivist theoretical approach. But consensus was demonstrated by content analysis. There was a shared view that highlighted the roles of knowledge transfer, individual values, experience, specialisms and academia in the context of knowledge and people. Overwhelmingly this study demonstrates that knowledge is people-centred despite a massive growth in technology, which is claimed to ease knowledge appropriation.

The person ascribed as a knowledge icon possesses epistemic skills and attributes that are not evident in all of us. This study encourages management to consider what steps can be taken to develop and utilise knowledge skills in a workforce.

The final chapter examines what this study has contributed to our knowledge and opportunities for future research. The abstract idea of knowledge is one of the most ‘perplexing’ notions in our vocabulary (Spender, 2000, pg.156) so this work reduces the confusion by indicating how a group of employees justify their knowledge claims. The group of people are linked by their functional unit but their approaches to knowledge warranties cannot be bound by the same entity and so we see individuals aside from their function placed in alternative communities. This work is original in incorporating the constructions of a wide range of employees and not only the owner manager or senior manager which so typifies other small firm research.

It exposes a range of themes that are worthy of further examination as they impact on many management processes.

Finally, in reflecting on the research approach we can conclude that throughout this study participants are considered not as objects of inquiry but part of an intersubjective experience. That experience involves a rare and appropriate research method that warrants greater exposure in the business research community.



## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### Overview

The focus of interest in business has featured upon what knowledge employers and employees possess, but little is known about its formation. Researchers in the business domain have taken a narrow approach to addressing questions such as: how do employees validate their knowledge? Do they all arrive at a state of knowing in the same way? If so, can we disclose the sources and criteria of knowledge? What kinds of knowing are possible and in business what is the relationship between the subject knower and object known. These questions are defined as the epistemology of knowledge, in that they aim to describe theories of knowledge.

Questions surrounding epistemology will be familiar to all in higher education as a methodology section is part of any thesis. Business academics have a long tradition of debating and exploring their position with regard to reality and committing their epistemological stance to the written word (Spender, 2000). Invariably, academic institutions have within their communities' expertise in the fields of philosophy, sociology and psychology. Therefore, it remains a paradox that business research is conducted by individuals/groups conscious of the value in questioning the meaning and

nature of reality but their attention has rarely focused on the ontological and epistemological views of research participants. This research responds to this shortfall by asking employees how they know what they know.

Researchers regularly demonstrate how they know what they know so that it can be judged within their community. Academic communities are provided with an arena for sharing their epistemological stance with a framework of journals, conferences and special interest groups.

It's interesting to compare the method of circulating knowledge within the established practices and formal processes of the scientific community.

(Brown and Duguid, 2000, p.80)

How do employees not familiar with epistemological debate perceive the knowledge of others within their workplace community?

A lack of consideration for the complexity of knowledge construction is reflected particularly in the nascent knowledge management literature. This thesis raises concerns about knowledge management which is seen as a management tool founded on ignorance of what knowledge means in commerce today. Contrary to Alvesson and Karreman's (2001) view that there has been sufficient focus on knowledge in the knowledge management discipline, some continue to stress the ignorance of our knowledge, of knowledge, in today's fast moving, multicultural and global business environment (Allix, 2003, Tsoukas and Vladimirou, 2001, Brown and Duguid, 1998 and Boyd and Wild, 1996). Their work is valuable in that it has moved away from a prescriptive push towards *knowledge management* and asked questions in respect of the

primary theme of knowledge. After all a firm's knowledge is what holds a firm together (Brown and Duguid, 1998).

This study approaches the knowledge issue from a small firm context. Exploring epistemological issues in small enterprise demanded a multi- and cross disciplined approach (Hart, 1998). Occasionally, management literature has attempted to review literature across disciplines and in particular, Boisot (1998) has been commended for an interdisciplinary bibliography (Shariq, 1998). There is a need to examine the work done outside individual disciplines and slowly this realisation has filtered through academia (Spender and Grant, 1996).

The literature review is divided into sections covering a working definition of knowledge, a review of works relevant to knowledge epistemology and an account of context in relation to this research. Next, two sections cover knowledge and people issues plus knowledge and artifacts. Knowledge and people incorporates a review of the role of personal knowledge, social construction of knowledge and an overview of literature relating to communities of practice.

Exploring knowledge issues in the workplace contributes to the growing interest in knowledge management and thus needs to be situated within the nascent literature. Therefore, an overview of the relevant points arising from knowledge management literature is included.



Finally, the literature review summarises the main issues and emphasises the purpose of this study.

## **Knowledge – Definition**

This thesis examines grounds for work-related knowledge used in a small firm. The emphasis is on grounds or warranty mechanisms (Brown and Duguid, 1998). Yet, a study aiming to examine knowledge warranting mechanisms is considered lacking if it excludes attention to the various definitions of knowledge. Contrary to the view expressed by Snowden (1998b) further attention to definitions of knowledge is valuable and called for in business (Tsoukas and Vladimirou, 2001). An interest in managing knowledge in organisations has not been fully supported by an interest in understanding the meaning of knowledge (von Krogh and Roos, 1996). Management need to understand what it is they are attempting to manage before they can exploit it (Spender and Grant, 1996).

Knowledge has been described simply as ‘that which is known’ (Wilson, 1996, p.33) without really expanding upon the question of epistemology or theoretical grounding for the known. Wilson also uses the phrase ‘it is an essentially human form of information’ (ibid.). The assertion that knowledge is fundamentally a human activity is widely supported, Shariq (1998). Davenport and Prusak (1998, p.5) declare, ‘All knowledge-creating activities take place within and between humans.’ Yet knowledge has been described as being held by ‘a bat or a biologist’ (Boisot, 1998, p.11).

Wenger (1999, p.141) describes knowledge as that ‘tricky’ word. Whilst Spender (2000, p.156) finds knowledge ‘the most perplexing notions in our vocabulary’ it is also seen by Alvesson and Kärreman (2001, p.995) as ‘an ambiguous, unspecific and dynamic phenomenon’. This complexity in definition is not helped by writers who proceed to list everything linked to knowledge as pertaining to knowledge (see Davenport and Prusak, 1998). It is also not helpful when writers use various questionable synonyms throughout their text. Almeida and Kogut (1999) provide an example of this by alternating between knowledge and ideas. Ideas are a by-product of mental activity and not wholly synonymous with knowledge.

Others have preferred to keep their definition vague. Funes and Johnson (1998, p.3) simply refer to knowledge as, ‘something intangible inside people’s heads’. This ‘something’ has been linked to intelligence as Davenport and Prusak (1998, p.5) reveal their own bias in a definition of a knowledgeable individual, ‘someone with a thorough, informed and reliable grasp of a subject, someone both educated and intelligent.’

The supporters of organisational learning would uphold the definition of knowledge as ‘first and foremost about learning’ (Dove, 1999, p.17). When clearly learning is a process and knowledge describes an outcome of the learning process.

It is the value placed upon knowledge that has created the greatest level of interest in business literature. For this reason it is suggested that the business literature has not laboured on any definition of knowledge but prefers to concentrate on the gain that can be made from the extraction, codification and distribution of information (Thompson et

al, 2001). This is critically seen as a resource based view of knowledge (Spender, 1996). Whereby a greater volume of information in an organisation enables it to function more effectively and efficiently therefore the more information that can make things happen is labelled as knowledge. Knowledge becomes yet another asset to be appropriated and valued.

The resource based view of knowledge concentrates on value as against meaning which is understandable in a dynamic competitive environment. It is not construed as a weakness in the business literature as the demands on firms to consider value in relation to knowledge is driven by the socio-economic climate. However, the ignorance of meaning is considered a deficiency and needs redressing. An alternative to the resource based view is a growing support for the knowledge based view of the firm (Spender, 1996, Grant, 1996). Knowledge together with distinctive skills and innovative routines now become central to the firm.

What constitutes the meaning of knowledge is determined as a combination of the scientific paradigm and the social paradigm (McAdam and Reid, 2001). Knowledge is constructed from a holistic combining of all things scientific and all things social, truth and principled justification blending with subjective tacit and socially constructed knowledge (Alvesson and Kärreman, 2001). This model presumes a considerable tolerance in society and a humanistic acceptance of the equality of all knowledge. McAdam and Reid explain the appeal of their modified version of Demarest's (1997) knowledge model as due to its wide definition of knowledge linked to the social and learning processes in a firm. This position is contradicted by a later statement in the



paper concluding that the model's appeal was the lack of assumption of any given definition of knowledge. The meaning of knowledge is apparently anything one wants it to be. Optimistically, this notion that has an indeterminate definition is embodied, disseminated and used to benefit the business and employees 'emancipation' (McAdam and Reid, p.232).

Jankowicz (1991) suggests the stance of knowledge is the antithesis of ignorance and its acquisition is the interplay between: an assertion that certain things might be true, information relevant to the truth or otherwise of the assertion and some method of bringing the first two elements together.

The term ignorance has negative connotations as if knowledge is always a good thing and ignorance undesirable. Yet studies have shown that ignorance may have a useful effect 'ignorance led them to proceed and succeed' (Spender, 1996b, p.67). An entrepreneur who sets out to justify their speculative knowledge using the Jankowicz (1991) framework may find their opportunity has passed whilst they gather information. In addition an element of ignorance is unavoidable as how do we identify what we don't know? (Cortada, 2001)

Knowledge amounts to gathered data and absorbed information congealing with existing thought to create original knowledge, a "black box" phenomenon (May, 1994). Knowledge, may also be defined as a constantly evolving phenomena based on proclamation. History has taught us that what maybe proclaimed as facts and instances

of truth can later be disproved however, the original proclamations were still highly valuable in the evolution of knowledge.

The philosophical debate has attracted writers from alternative fields, for example, Machlup (1980) from economics and Berger and Luckmann (1991) as primarily sociologists. A definition of knowledge used by Berger and Luckmann (ibid.) is related to their view of reality in the interests of sociology.

It will be enough for our purposes, to define 'reality' as a quality appertaining to phenomena that we recognize as having a being independent of our own volition (we cannot 'wish them away'), and to define knowledge as the certainty that phenomena are real and they possess specific characteristics. (p. 13)

Machlup (1980) apologises for his uneducated leap into philosophy by a trained economist. His evaluation of the role of knowledge on the macro-economic position of a nation recognises the link between the knowledge of a population and how this can affect the wealth, progress and power of the nation. His definition of knowledge remains broad, 'Anything that people think they know I include in the universe of knowledge' (p. xiii)

This thesis relates to participant's knowledge of, knowledge about, knowledge that and knowledge how relative to their work and precludes social and leisure interests. The type 'knowledge of' is in terms of an acquaintance with the person, place or product whereas 'knowledge about' is a greater embeddedness with the thing in question. The type 'knowledge that' is in relation to the facts and the properties of an agent whereas 'knowledge how' infers an ability or activity (Machlup, 1980).



In comparing 'knowledge that' and 'knowledge how' Ryle (2000) felt the position of 'knowledge that' can be acquired quickly compared to a long gradual familiarisation to reach the position of 'knowledge how' (or inculcation). Polanyi (1962) disputes this view and uses the example of the theory of relativity which after years of study can still prove troublesome to master. Debating the time taken to be in a position of *knowing how* or *knowing that* seems futile when every instance is likely to be different. In some cases the gifted can 'know how' quickly whereas others may struggle to master the practice, for example knowing how to play the piano for some is relatively easy and for others painstakingly slow. It is suggested that the art of reaching a state of *know of, that, about* or *how* may be individual (Funes and Johnson, 1998). Yet, knowledge as an individual *possession* has been criticised (Cook and Brown, 1999).

Ayer (1956) and Machlup (1980) view knowledge as a body of content with an individual empowering capacity. The focus on content has been the over-riding theme of research into knowledge in the commercial context. Knowledge is seen by Remenyi et al (1998) as a powerful and misused concept with controversial examples provided from genetics and information systems. The idea of knowledge having powerful qualities has been supported throughout history and is now being used to highlight the importance of knowledge management tools in today's economic climate (Neef, 1999 and Tomasko, 1993). The premise is perhaps most commonly seen when based on an individual possessing specific knowledge in an area has power over other individuals who do not possess this knowledge. Boisot (1998) refers to the positional status of knowledge by proposing that as personal knowledge becomes common knowledge it retains less value. Knowledge possesses a competitive advantage when others do not share it. Hence the



fascination with controlling the distribution of knowledge and paranoia with sharing what one knows. Knowledge itself does not give special power; only exclusive knowledge gives a perception of power to some (Friedson, 1973).

In defining knowledge some have questioned whether knowledge can have a value placed upon it or whether questioning the truth of a matter has purpose (Machlup, 1980, Polanyi, 1962). The question of truth is rejected as:

Knowledge need not be knowledge of certified events and tested theories; it may be knowledge of statements and pronouncements, conjectures and hypotheses, no matter what their status of verification maybe.

Machlup (1980, p.118)

The focus on work related knowledge used in this thesis does not set out to provide an outline of valuable knowledge or a set of truths. It was a study of warranting in work-related knowledge used by participants whether their work knowledge was verifiable or not and regardless of the value the management may have placed upon it.

When struggling to grasp an understanding of the difference between knowledge and information we can look to the verbs from which the noun has been derived, that is, to know or to inform (Machlup, 1980). Information is needed to provide a new point of view and inform the knowledge that is possessed. There are two aspects of information, volume and meaning. An over emphasis on volume has directed attention away from the need to examine the meaning of information available. It is the meaning embedded in the information that will affect the individual's knowledge stance.

The verb to know implies a state of being and to inform implies an action. A state of being indicates rigidity but this is far removed from a dynamic state of knowing. Knowing something involves an on-going process (Choo, 1998, Nonaka and Takeuchi, 1995, Spender, 1996).

First, knowledge unlike information is about beliefs and commitment. Knowledge is a function of a particular stance, perspective, or intention. Second, knowledge, unlike information, is about action. It is always knowledge to some end. And third, knowledge, like information, is about meaning. It is context specific and relational.

(Nonaka and Takeuchi, 1995, p.58)

We know something because we sense we need to know in order to function. Knowledge is part of an activity system and activity makes knowledge meaningful (Tsoukas and Vladimirou, 2001, Spender, 1996). The link between knowledge and behaviour has not been researched sufficiently in the business context to presume that all knowledge will lead to efficient and effective action. In their work on knowledge in organisations: Badaracco (1991), Boisot (1998), Davenport and Prusak (1998), Nonaka and Takeuchi, (1995) Prichard et al (2000), Sparrow (1998) and Wilson (1996) refrain from exploring the effect of new knowledge on the individual. Controversially, knowledge is seen to always result in positive action (Boisot, 1998). Insufficient research has taken place to uncover what changes take place for the individual when confronted by new knowledge in the workplace.

It is incorrect to presume that it is knowledge that controls all behaviour. Griffiths (1967) uses the example of the neurotic who wakes several times in the night to make sure that he/she has locked the door. The neurotic knows perfectly well that the door is



shut but has an unsure feeling. The employee may exhibit tremendous knowledge relevant to their role in the firm but this does not guarantee the activities of the employee will always benefit the employer. Employee knowledge may exist but the individual may anticipate little gain from utilising what is known. It also fails to acknowledge the employee as an individual with real-life problems and difficulties that may present obstacles to the utility of existing knowledge (Wenger, 1999).

Knowledge is not responsible for the action of individuals it is beyond any mental state (Reid, 1961). The individual's state of mind will have a bearing on the utility of any knowledge as for example, Griffiths (1967) also notes the knowledgeable child who is petrified of the teacher and freezes when asked a question but really knows the answer.

Bhatt (2000, p.90) prefers to think of knowledge as, 'an organized combination of ideas, rules, procedures, and information'. The term 'organisation' of this combination suggests a formal structure and possibly a hierarchy drawing from the elements of ideas, rules, procedures and information. Bhatt does not expand to illuminate any value system or verification procedure to apply this structure to the organisation of knowledge. Like Rowley (2000) knowledge is conceived as a compound of abstractions.

Boisot (1998) describes knowledge as:

.... a set of probability distributions held by an agent and orienting his or her actions. These either consolidate or undergo modification with the arrival of new information. (p.12)

This description of knowledge as probability distributions could be compared with the personal constructs in the writing of Kelly (1963). Constructs are representations of the



universe that are subject to revision or replacement. The Theory of Personality outlined by Kelly is dominated by a fundamental postulate and supported by eleven corollaries (inferences). See Appendix II. The theory suggests that we are constantly looking to the future and using our sense-making constructs to enable predictions to be made. If the sense-making constructs prove useful then we maintain their definition, if not, they are modified or rejected:

Each day's experience calls for the consolidation of some aspects of our outlook, revision of some, and outright abandonment of others

(Kelly, 1955, p.14)

It is useful to think of knowledge as a structure within the framework of which know how, know of, know about, know that and know how takes shape or assumes meaning. The work of Kelly is expanded upon in Chapter 3 Research Methodology.

Knowledge has previously been regarded of greater significance than information but this view is diminishing (Usher and Edwards, 2000). Knowledge is now becoming commoditised, a marketable product, and an element for exchange. Knowledge is no longer seen for its value to all society and as a contribution to progress. Accordingly, knowledge is now barely distinguishable from information (Usher and Edwards, 2000). The knowledge that matters is the knowledge that can be extracted and converted to computer text. This dissolution of knowledge is further enhanced by the lack of potency of epistemological boundaries. Some appear disparaging of the growth in the number of university institutions, research texts, wider opportunities for publication and the direction of research funding towards 'immediate policy pay-off' (Usher and Edwards,

2000, p.254). It is argued that the new electronic forms of presenting information devalue what would previously be regarded as the regulation of new knowledge claims.

The impact of computer technology cannot be ignored in this knowledge debate. In recent years professed knowledge management based IT tools are designed to empirically extract and codify what is known by individuals or groups in the firm to create hard data or knowledge representations, which can then, be shared. What is being hailed as knowledge resembles a development of data that does not unequivocally lead to greater knowledge capacity but resembles an elaboration of information management (Gourlay, 2000). The acquisition of knowledge may not, contrary to popular opinion be an explicit set of codifiable symbols.

The only knowledge that matters is not that extracted and exchanged for computer text (Scarbrough and Swan, 1999). Knowledge remains a state of being and the exposure to explicit codified data does not necessarily change that personal state of being. To be in the position of knowing something one needs to have grasped paradigmatic kinds of situations, and processes and tested them pragmatically for goodness of fit (Allix, 2003, Choo, 1998). Knowledge thus has a fluid characteristic with a changing range of convenience (Kelly, 1963).

Gergen (2000) also claims the eulogising of science and knowledge has begun to fade. Many organisations have employed scientific knowledge for self-gain and to societies detriment thus leading to a scepticism for new knowledge claims. Gergen gives the examples of pesticides unsettling fragile food chains, the pollution of cities and the



subjugation of people. There are calls for an expansion in a post-empiricist examination of what now creates worthwhile working knowledge (Garrick and Rhodes, 2000).

Knowledge involves more than education and experience. It is essential that types of thinking and thought processes are also embedded in employee's knowledge (Sparrow, 1998) in addition to education and experience. It is clear that a person's education and their life experiences will play a role in the cognitive structure by which they see and interpret events but other variables are also relevant (Nystrom and Starbuck, 1984).

We cannot equate knowledge with the education and experience that organizational participants have had. We cannot regard it as the facts and opinions that people have.

(Sparrow, 1998, p.26)

Knowledge implies all kinds of mental material, forms of thought and types of thinking and information acts as the representation of knowledge (Sparrow, 1998).

The meaning of information has not historically demanded such debate as this abstract notion of knowledge. Nonaka and Takeuchi (1995) building from Polanyi (1962) explain knowledge in terms of tacit and explicit characteristics. Despite a background in chemistry Polanyi (1962) determines knowledge as an art. Polanyi draws from Gestalt psychology denying the existence of impersonal objective knowledge. Gestalt theory suggests human beings are viewed as open systems interacting with their environment. Polanyi revises the culture of a division between fact and value replacing this with an integrated culture. For Polanyi, to know something is to have an operative comprehension of the things that are known. This act of comprehending demands a skill.



Skilful knowing and doing is performed by subordinating a set of particulars, as clues or tools, to the shaping of a skilful achievement, whether practical or theoretical. (Polanyi, 1962, p.vii)

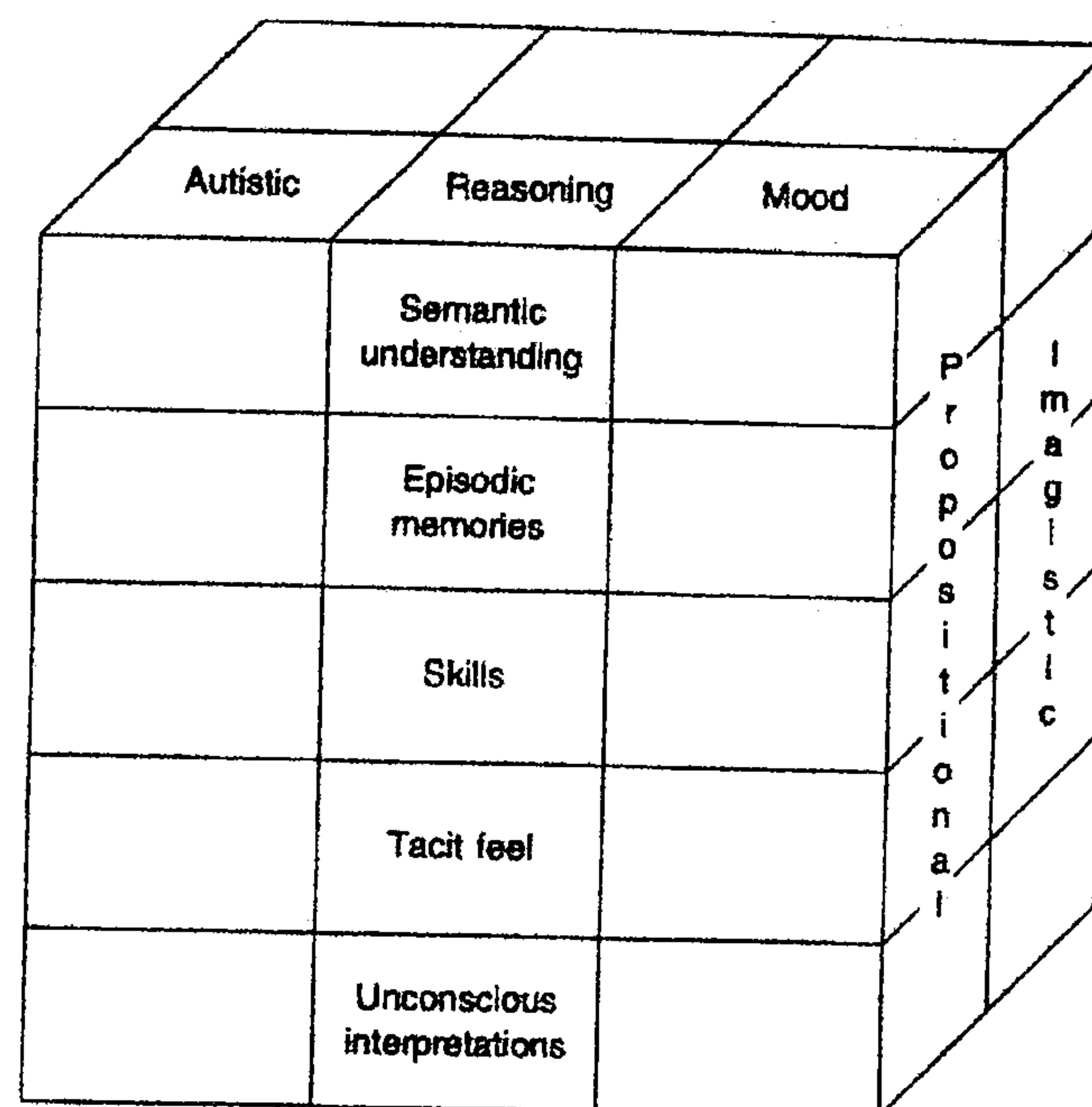
This personal activity, offered by Polanyi is not suggesting the existence of a totally subjective reality but claims it is objective in establishing a type of contact with a hidden reality. The hidden tacit reality described by Polanyi coexists as part of social reality; portions of the real world are only objective facts by human agreement. For example, currency is pieces of paper with a particular value mutually agreed only between social groups (Searle, 1995). Parallels may be drawn between this view and that of Kelly (1963) who also identified with the notion of a real world out there which we strive to understand but is left open to as many constructions as there are number of individuals. What is known about the world is open to revision or replacement it's a person's life-long endeavour to make sense of our experience of the world (Polanyi, 1962). In the work place employers and employees are trying to make sense of the situations they experience (Wenger, 1999, Weick, 1995).

This explicit/tacit delineated approach seems insufficient and knowledge may best be represented by Sparrow's (1998, p.45) three dimensional combinational model (See Figure.1). The face of the cube includes semantic understanding, that is, what we consider as the facts drawn from primarily our formal education. In addition, the mental material includes episodic memories, the sequence of events installed in our memory relating to our experience. This is combined with skills that have been acquired to the point where they do not surface conscious thought processes. Next, tacit feel is described as the product of pure experiential learning and does not appear to involve any

verbal reflection. Finally, Sparrow sees the mental material containing, unconscious interpretations as the preferences we unknowingly impose on decisions.

### **FIGURE 1**

Kinds of mental material, forms of thought and types of thinking (Sparrow, 1998, p.45)



The other elements of the model represent forms of thought and different types of thinking. The latter describes autistic thinking, reasoning and mood. In this sense autistic is not describing a medical condition but a self-generated form of thinking without reference to an external reality. Autistic thinking may be simplified as the state of day dreaming. Reasoning is the 'figuring out' or personal logic used to justify the interrelationship between concepts. Sparrow stresses this is not a logical form of reasoning linked to a grand objective rule but a personal process. The term mood is used

to describe ‘particular patterns of thinking’ (Sparrow, 1998, p.43) and is often ignored by employers who disregard mood as irrational thought.

The forms of thought are propositional and imaginistic. The propositional is the idea that linkages are made between the idea/object/event and the existing mental material. Understanding someone’s propositional form of thought assists in understanding their decision-making. The imaginistic is the mental images we build that for some can be particularly vivid whilst for others lack richness and detail. The imaginistic form is not verbally constructed and is difficult to represent. When an imaginistic mental image is portrayed perhaps in a diagram or picture then it can often be worth far more than the written word.

This three dimensional model of the complex nature of knowledge in a work environment strengthens the argument for the denial of the convergence of information and knowledge. It is clear the abstract notion of knowledge is quite distinct from information.

### ***Knowledge Definition - Summary***

This first section of the Literature Review examined definitions of knowledge including a comparison between knowledge and information, incorporating Sparrow’s (1998) useful framework. The literature was drawn from across disciplines in order to expand the search for a precise definition. It is apparent that a consensus has not been reached that encompasses all aspects of knowledge and calls for a ‘cohesive identity’ (Shariq,



1998, p.11) remain elusive. However, it is clear that the meaning of knowledge has been questioned over the centuries and its nascent link with information as a tradable commodity demands extensive research. The debate has thus begun to move from what is knowledge (origin, character, nature, and distinguishable qualities) to what is the value of knowledge. A move which contrasts with Machlup (1980) and the notion of value free knowledge.

Defining working knowledge is relevant if management is to gain from the knowledge base of the firm. It would clarify what should be upheld as knowledge. Management need to question whether in this global working environment we all share the common view of knowledge and are therefore willing to co-operate in the management of knowledge.

We need to look at definitions of knowledge within particular contexts and avoid the statement of an all encompassing generalist definition. By recognising that knowledge may mean different things in different contexts with different communities we will have gained an improved working definition with relevance to a particular community (Tsoukas, 1994).

This study upholds the definition of knowledge as an active state of being. It is who we are and the many facets of knowledge in organisations are best currently represented by Sparrow (1998). Knowledge is not a simple linear move from data and information. It is an abstract that we live with and have been trying to understand for thousands of years.

An aspect of this understanding is brought about by looking at a branch of knowledge – epistemology. How do we know what we know?

### **Knowledge Epistemology (how do we know what we know)**

This thesis asks how management and employees know what they know in the world of the small business. It is a philosophical question that has received considerable attention from other areas outside of this business domain but only a cursory glance from within its own population (Allix, 2003). Reviewing the historical literature addressing epistemology from philosophy and range of views in academia it is clear that organisational knowledge may draw from the expertise in these areas.

### **Historical Epistemology**

Exploring questions of knowledge and its meaning has traditionally been the role of the philosopher. Yet there are calls from within strategic management for more to be involved as this theme of knowledge is now best served by a complementary attention to the manner of knowing (Spender and Grant, 1996).

Historical antecedents of epistemology suggest knowledge and questioning how we know what we know reputedly began 2,500 years ago with the Ancient Greeks (Reaper and Smith, 1991). The historical literature related to epistemology of knowledge is vast and this brief historical review touches on only selected important developments related to this research.

The first Western writing on this issue is attributed to Socrates (470-399 B.C.) via his pupil Plato (427-347 B.C.) and Aristotle one of Plato's pupils. The two theories offered by Plato (see Shorey, 1969) and Aristotle to explain knowledge are important foundations for what is referred to as the branch of philosophy that studies knowledge "epistemology". Epistemology is the study of three questions: How do we know? How much can we know? And how can we be sure that what we know is correct? Plato proposes that what is thought of as knowledge is usually opinion and therefore it is impossible to have a true universal knowledge about objects. The three Forms described by Plato are beauty, truth and justice and are independent of the mental world of people's minds. They are the only things that could be known due to the changing nature of the physical world. Aristotle's own theory severely condemned Plato preferring to take a greater interest in the physical world and the 'matter' of what the world is made of. Aristotle has influenced ways of knowing about the world based on perception, observation and investigation.

Aristotle and Plato dominated perceptions of knowledge into the 17th century until the groundbreaking work of Descartes (see Weissman, 1996). Descartes began by suggesting that everything should be doubted until there is nothing to doubt, putting knowledge to the test. He drew the conclusion that as he knew he existed then perhaps other things existed in the same sense. However, he believed there are limits on certainty and therefore it is only the mathematical properties of objects that are certain. He divided things by their quantitative characteristics, which could be known for certain and their qualitative characteristics, which were subjective and not certain. Like Plato, Descartes thought we possessed innate ideas, that is, ideas we are born with. According



to Descartes we are born with knowledge of God, mathematics and ourselves. Throughout our lives we then use reason to discover this knowledge. This concept is classified as rationalism, as we acquire knowledge through reason and not our senses, and has dominated modern science.

Three further philosophers in the 17th/18th centuries provided literary works of note that shaped western epistemology: Locke (see Yol, 1993), Berkeley (1962 *reprint*) and Hume (See MacNabb, 1951) commonly labelled 'British Empiricists'. In Locke's opinion all knowledge comes through the senses and we can never really know the natural world. Touch, sight, hearing, taste and smell thus identify knowledge. The ideas of Descartes were rejected as Locke admonished the existence of innate ideas. In Locke's opinion we are born without knowledge and it is derived from experience. Even if something is universally known it does not necessarily mean that we were born with this knowledge or it is certain. Locke concludes that we can possess three types of knowledge. An intuitive knowledge from where we derive knowledge of the self, a demonstrative knowledge providing knowledge of God and finally sensitive knowledge which permits guesswork of the external world.

Locke is the most notable and oft quoted British Empiricist but Berkeley and Hume also wrote on similar themes to Locke. Berkeley went further than Locke by proposing that all we can know is our experience and that matter cannot be known at all. Berkeley was concerned that philosophy was leading to atheism and therefore pushed for the concept of an ultimate Perceiver, that is, God who was able to perceive things beyond us the perceivers. Locke and Berkeley agreed that we could never really know what exists

beyond ourselves. Hume, the supreme sceptic proposed we could neither know about our world or ourselves.

The debate between rationalism and empiricism remains active in the academic and literary world. The two opposing beliefs in the route to knowledge also led to the development of deductive and inductive methods. The motivation of the rationalist has always been mathematics and the superiority of deductive methods over inductive methods. Deductive methods are a move from the general to the particular and inductive a move from the particular to the general. The Empiricist also used some deductive reasoning but argued the value of inductive methods.

The meaning of knowledge and the position of rationalism were further questioned by the existentialists, Soren Kierkegaard (1813-1855), Martin Heidegger (1889-1976) and Jean-Paul Sartre (1905-1980) and led to the rise in prominence of the subjective view and an extreme individualism. Existentialism does not account for the nature of the universe and what are commonly considered to be philosophical issues. Kierkegaard is generally considered the founder of modern day existentialism. He commented on the folly and ambiguity of the human situation with the only hope of survival from despair and angst being a belief in one's own goals in life. Ayer (1973) felt this desperate searching for a reason for being by the existentialist was 'emotionally understandable but not intellectually coherent' (p.216). Sartre continued with this pessimistic view after the Second World War but claimed his form of existentialism was also humanist and eventually became linked with the Marxist movement.



Prominent humanist writers such as Bertrand Russell, Sir Julian Huxley and Sir Alfred Ayer offer yet an alternative view of reality (Reaper and Smith, 1991). Their approach to knowledge followed the empiricist line in that knowledge is acquired through the senses. The humanist has faith in man's intellectual and spiritual resources not only to bring knowledge and understanding of the world but to solve the moral problems of how to use that knowledge. In his essay 'Philosophy and Knowledge' Ayer (1956) concludes:

....that the necessary and sufficient conditions for knowing that something is the case are first that what one is said to know be true, secondly that one be sure of it, and thirdly that one should have the right to be sure. (p. 35)

Hamlyn (1970) and Ayer (1956) discuss the difficulty the sceptic has with perception being the route to knowledge of an objective reality. Hamlyn felt it could not be denied that we do acquire knowledge through sense data, but to what degree? Hamlyn sets out the example of someone claiming to perceive a ghost and another claiming to perceive a person on television and questions whether the difficulty arises with sense-data due to the kinds of perceptual claim. At times there appears good reason to doubt the perceptual claims of a person but on other occasions there is no doubt or denial of a thing existing beyond our own private perception. A gap between evidence and conclusion needs to be bridged in order for the sceptic to accept sense-data (Ayer, 1956). Troubled by the idea of knowing how things are only by how they seem to be Ayer used the example of a cigarette case as it appeared before him on a desk. The claim of seeing the cigarette case is proclaiming more than perhaps the perception warrants and Ayer adopts a system of reducing the statement to pen-ultimately 'it now seems to me that I see a cigarette case' and finally 'I am now seeing a seeming-cigarette case' (p.96). Thus Ayer argues the sense-data in this example is 'the seeming cigarette case'. Hamlyn



criticises the reductionist process adopted by Ayer and disputes whether Ayer can make claims for the contents of our sense-experiences as if something is 'given' to the senses. Hamlyn concludes that for Ayer what one is aware of is not an independent objective world but a private world of sensory perception and therefore Ayer's philosophical stance cannot claim knowledge of a public world.

The future of knowledge epistemology is now affected by 'New Ageism' which has already created impact on the lives of many in the Western Hemisphere (Reaper and Smith, 1991). A definitive description of the New Age is really a collective of many ideas and beliefs from paganism to eastern religious influences but is strongly focused on knowledge of the self. Interest is in the individual possessing freedom and choice and living in a community of equality and tolerance. An example of this tolerance is provided by Hutcheon (1992) who reports on the findings of research carried out to gain the views of university researchers on the meaning of knowledge within the context of their different disciplines. It was found that their essays reflect a willingness to question what the individual disciplines consider as knowledge and this is reflected in a new sense of ease and liberation evident in each person's view. New Ageism is an evolving philosophy but one without any apparent specific views on the nature of our knowledge of the external world. Victor Suchar of the Bath Royal Literary and Scientific Institution reports on the Twentieth World Congress of Philosophy (1998) in Boston claiming that the failure of philosophy in this century has not been the lack of fecundity but its inability to link knowledge, action and valuation. Liberation in views has advanced our understanding of differences but led to even greater diversity and autonomy. Audi (1998) asks what standards of evidence should be used in seeking truths about the

worlds and human experience. To claim knowledge what conditions must be satisfied – truth, belief or justification? (Lehrer, 1974). This thesis is not offering a prescriptive response but first asks what evidence is being used in a small firm.

### ***Summary***

Three questions: How do we know? How much can we know? And how can we be sure that what we know is correct? Have been studied for 2,500 years and the work continues. Most philosophical debate has begun with a view of knowledge as justified true belief then moved to an account supporting either rationalism or empiricism. There is a sense of greater tolerance for epistemological differences but also a feeling that the differences add to complexity and chaos. Pinning down a certainty, a fact, a truth and knowing that one is sure and has that right to be sure is problematic in our modern world.

### **Academic Approach**

Adding to knowledge is a fundamental activity of the academic research community (Tsoukas, 1994). In this section the literature has also aided the distinction of a suitable research methodology. Thus, the academic research literature has two synergetic roles, to inform the research theme and secondly to inform the research process. This second role is covered in greater detail in the Research Methodology chapter.

Research is a campaign with three fundamental questions overhanging ‘What is happening?’ ‘How can I prove it?’ and ‘How do I know?’ (Jankowicz, 1991). How we see ourselves in relation to the issue of knowledge is determined by how we view reality



(Maykut and Morehouse, 1994). It is essential that a person's view of what reality is becomes the pre-requisite for any knowledge claims. In order to acquire knowledge the positivist is seen to divide and study the parts of one whole, which the researcher can stand apart from. The phenomenologist co-constitutes a world and stands within it.

The experience of knowing and how we decide what is known is critical (May, 1994). Nursing communities are wrestling with the notion of tacit knowledge and the complex building of various forms of knowledge (May, 1994). Concerns are for those who seek to utilise qualitative methods but need to argue for the validity of their work and satisfy others that the results are akin to knowledge and are not opinion or conjecture. The quantitative scientist will detail a rigorous method, the collection of data, the correct method of analysis, the observable and external issues but immense problems exist for the qualitative researcher faced with non-observable and non-measurable processes (May, 1994). The selection of method by either postulate and the stringent application of this method are essential to the process but does not equate to the insight, understanding and 'leap that the agile mind makes in the struggle to comprehend observations and to link them together' (May, 1994, p.13).

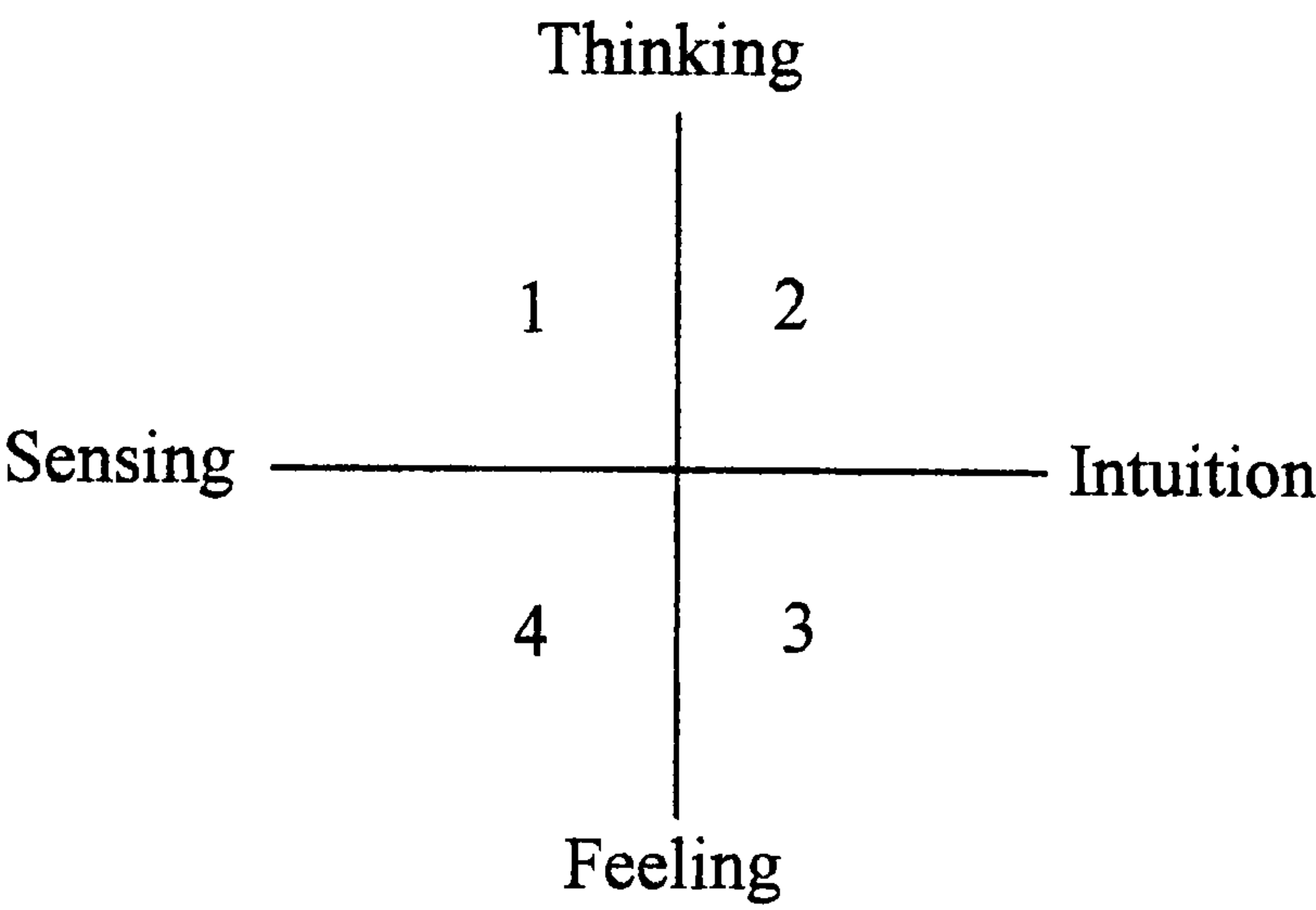
The study of the social sciences has been parted by a new paradigm for research which is objectively subjective (Reason and Rowan, 1981). Knowledge can be derived from naive inquiry with all the elements that positivists abhor; biases, prejudices, anxieties, group conformity and so on (ibid.). A typology of research is drawn from Jung's (1971) collected works where distinctions are made based on information absorbed internally through intuition or externally through the senses (See Figure 2). In addition, decision-



making based on thinking and reasoning, and is impersonal or alternatively a feeling and personal value-laden process.

FIGURE 2

A typology of research - extract from Reason and Rowan (1981)



The typology ‘Analytical Scientist’ is seen to fit best within quadrant 1, that is, the sensing and thinking quadrant. The imperative is the need to seek certainty with the impersonal, dispassionate controlled experiment. Quadrant 2, Reason and Rowan label the ‘Conceptual Theorist’ (thinking and intuitive) and underneath this in Quadrant 3 is the ‘Conceptual Humanist’ (intuitive and feeling). The Conceptual Theorist aims to build theory, which is impersonal, by using the skills of the thinker but the decision-making methods involving intuition. The Conceptual Humanist is also using intuition but sees value in the uniqueness of the phenomena or person. Examples of methods favoured by the Conceptual Humanist are collaborative inquiry, experiential research and an emphasis on the reflexive. Finally, in Quadrant 4 is the ‘Particular Humanist’ (feeling and sensing) a complete antithesis of the Analytical Scientist. Reason puts the case study method into this category.

In Reason's appreciation of Mitroff and Kilmann (1978) use is made of a diagram to expand upon the typologies modelled by Jung (1971), (See Appendix I) detailing the various characteristics of the analytical scientist, conceptual theorist, conceptual humanist and particular humanist. It is questionable as to how closely an analytical scientist would identify with this typology, as for example, there are times when the output is not apolitical or independent and value-free. Likewise the Particular Humanist may not always be able to withstand the intensity of the human inquiry but feels compelled to produce results. It should be added that these labels are construed as the ideal and occasions arise when all of the distinguishing characteristics may not be met. The typologies are effective in enabling the individual to identify with a particular dimension and in effect follow the recipe for success for claims to new knowledge and recognition within the particular research environment.

The diagram clearly illustrates the epistemological polarities of the meaning of knowledge for the analytical scientist and the particular humanist. However, Reason proposes that the new paradigm research does not look to preclude or segment but to look for ways to integrate a systemic view of science. It is not proposed that the traditional goals of research, that is, the systematic and rigorous search for truth, be amended but the acceptance of different methods to pursue those goals. Reason and Rowan (1981) promote an active knowing that is helpful and dynamic. Active knowing suggests an emphasis on *usefulness*.

The Frankfurt School for Social Research in the 1920's emphasised utility in place of the awe and wonder of scientific inquiry and was described by Warren (1998) as perverted.

Promoting the contribution of usefulness to further the development of mankind moves the emphasis away from seeking truths (Remenyi, 1998, Kelly, 1963). This leads to the idea of knowledge being something that has an effect and prompting activity (Reason and Rowan, 1981). It also supports Boisot's (1998, p.13) assertion that knowledge assets are those accumulations that yield a 'stream of useful services'. We are unable to observe the abstract notion of knowledge but its existence becomes evident when activity arises based on knowledge utility. Grounds for knowledge are hidden within an activity testing environment, a laboratory (Kelly, 1963).

The value of output is seen in terms of people coming to know things, know how, know why, know what and making knowledge work (Reason and Rowan, 1981). Emphasis is placed on researchers becoming involved, using intuition rather than the senses, adopting the attitude of the naïve inquirer rather than the expert, participating rather than remaining distanced from the phenomena to be studied. Research needs to applaud the form of inquiry that is part of our humanity and not treating people as things, lifeless objects which in their view leads to accurate but boring output bearing no resemblance to deeply interesting people. The use of the term knowledge in a scientific empirical sense, separated from action requires special justification as it implies that it has no utility in our lives (Reason and Rowan, 1981). The advancement of propositional knowledge needs the support of know how (practical) and knowing of (experiential) as components to the process of knowledge acquisition.

Academic research continues to broaden the view of what constitutes methods of knowledge creation. A range of methods provides choice but there is agreement that the



fundamental principles of science are paramount to ensure standards are maintained (Remenyi et al, 1998). Academia has formed active communities that share and question knowledge epistemology within and across disciplines (Tsoukas, 1994).

Research methods; used in the physical and natural sciences, are embedded and do not have to be taught due to the historical tradition associated with this research (Remenyi et al, 1998). Whereas research methods in the social sciences are still being examined, developed, improved and taught to research apprentices. Embedded research methods in the natural and physical sciences maybe the case but Polanyi (1962) felt that all researchers benefit from probing the philosophical foundation for their selected methods regardless of the category of research.

### *Summary*

The academic approach to grounds for knowledge claims reveals debate, conflict and confusion across the disciplines. The aim of academic research is to broaden our knowledge and yet the warranting of knowledge and how to acquire and justify new knowledge is still widely questioned. This pluralist situation is not to be condemned as unproductive because it provides a fruitful platform of ever-evolving views and ideas to develop. The academic community has a vital role to play in maintaining this expansion of the grounds for knowledge. Defining a fundamental generalist common methodology would create stagnation and complacency across all disciplines.

There is an interest in the utilisation of research tools from across different disciplines as it is recognised that each discipline has developed patterns of research unique to the

subject area. An acceptable method of adding to knowledge in one discipline is now being explored by another discipline (for example, the use of qualitative methods in nursing and the use of phenomenological methods in business). Thus what the academic community consider acceptable as grounds for new knowledge evolves.

### **Organisational Knowledge – Epistemology**

The historical significance of knowledge epistemology has slowly filtered through to organisational knowledge (Allix, 2003, Spender, 2000, Ives et al, 1998). Yet the nascent focus on knowledge in organisations has been accused of only paying a cursory glance to disciplines that most directly and rigorously help in understanding knowledge (Allix, 2003, Ives et al, 1998).

Badaracco (1991), Boisot (1998), Davenport and Prusak (1998), Dixon (2000), Nonaka and Takeuchi (1995), Prichard et al (2000), Sparrow (1998) and Wilson (1996) all take a different approach to the notion of knowledge. Some barely acknowledge the immense literature already in this domain whilst others provide a sketch of the philosophical issues and historic background of knowledge (Allix, 2003). Kalthoff et al (1997) include a summary account of the historical context of the search for knowledge beginning in Europe in 400BC. This they saw was an identifiable point of the Europeans ‘quest’ beginning with Socrates followed by Plato, then Plato’s student Aristotle. They identify the scholastic movement in Europe, commenting on St. Anselm’s “credo ergo cognito” (I believe, therefore I know). Kalthoff et al (1997, p.5) describe Abelard’s challenge to this doctrine and the revised paradigm of what has now become in their opinion the



familiar climate for intellectual inquiry, that is, a search for truth, 'By doubting we come to examine, and by examining so we perceive the truth.' Kalthoff et al utilise the Platonic Forms of Truth, Goodness and Beauty throughout their volume to frame their thoughts on our conquest to further knowledge of our world and do not acknowledge that Plato's work was contested by his own pupil Aristotle.

Derivatives of the term epistemology have crept into the subject content of business literature and not just methodology sections of business journal articles:

....epistemological manner shared by organizational members at Honda

(Nonaka and Reinmoeller, 2000, p.96)

Moldoveanu (2002) has suggested a collective epistemology in the processes of due diligence. Snowden (1998b) suggests 'epistemology' may be unfamiliar to management and advises his audience to read a text book covering the area. Taking this further Boyd and Wild (1996) recommend management researchers need to take their inquiry into different maps of reality and understand not just epistemological issues but also ontology. Interpreting ontology and epistemology has been traditionally left to the specialist philosophy community who have expertise in this field. Additionally, as highlighted earlier, all academics are recognised for their appreciation of many variations in assumption and knowledge claims, showing a healthy respect for epistemological difference (Tsoukas, 1994). Now there are calls from writers in the business domain to open up the epistemological inquiry as part of a new style of management (Moldoveanu, 2002, Boussouara and Deakins, 2000, Sparrow, 1998).

Apprehending a common sense reality of everyday life is beset with difficulties as we are part of this everyday life and when we stop to look, the environment can appear



different (Berger and Luckmann, 1991). But this difficult enquiry needs to commence as management appear to know little about how and on what basis the content of their employees and their peer's knowledge is formed (Alvesson and Kärreman, 2001).

The interest in organisational knowledge has been swamped by prescriptive tools aiming to make tacit work related knowledge, that is, content of what is learned that is hard to articulate into explicit work related knowledge, which is easily shared. This dimension of knowledge is challenged as routinely following the epistemological Cartesian tradition still driving for objective and explicit terms (Cook and Brown, 1999). Explicit knowledge does not always produce results. It is possible to read a book describing the physical forces involved in riding a bike but this explicit knowledge cannot itself teach a person to ride a bike (Cook and Brown, 1999). Likewise the tacit knowledge of riding a bike does not result in a precise explicit account of how it is done. Cortada (2001) recommends a combination of methods is used to broaden knowledge, reading books and magazines, watching television and browsing the internet and expanding a social circle. It is the combination of these different methods that leads to knowledge rather than a concentration on any one particular method. So, what can be made of the latest calls to make explicit how employees know what they know and what is their reality? Garrick and Rhodes (2000) ask, how can we justify what is out there being used in the workplace as real knowledge? Alvesson and Kärreman (2001) also wonder what will happen if we reveal greater diversity in how employees know what they know – can management cope.

These questions have rarely been addressed therefore at present it is unknown whether attempts to divulge responses will have an effect or not. Exposing how something is known in the workplace may not provide an accurate explicit account of the conditions required for knowing in the workplace but it can suggest alternatives to existing conditions used by employees.

One approach to epistemological inquiry in the workplace has been carried out by Bhatt (2000). This favours the active interpretation of experience, and outlines the practice of *meta-dialogue* to enable the sharing of experiential knowledge, without the reliance on literary format. The description of meta-dialogue resembles a discussion to validate and support what could be the case. Employees are asked to consider the questions of what they know and how they know and open this for conversation. It encourages a tolerance for other individuals and is a move away from the destructive debate with winners and losers and clever persuasion tactics. The meta-dialogue encourages respect and aims to seek mutually agreeable 'guarantors' to support what is known.

Our Western Hemisphere has been too pre-occupied with the emphasis on knowledge as justified true belief whereas in other parts of the world and in certain contexts justified belief is sufficient to merit knowledge (Nonaka and Takeuchi, 1995, Garud and Rappa, 1994). The explicit knowledge that justified belief is used by employee X whereas employee Y would only consider justified true belief as a condition for knowledge claims could be a useful tool. Many employees appear to work with a belief system that they find sufficient to act upon (Moldoveanu, 2002). They believe something to be the case but they do not know something to be the case. Garud and Rappa (1994) support



this in their research which then went on to show that employees go on to design processes and testing systems that will show that the belief system was the correct way to act. This thesis does not propose that acting on either a belief or knowledge based system is the only recommended route but develops the idea that such different views may exist in the same workplace.

### ***Summary***

Interest in knowledge in the workplace has grown but writers in this field have frequently overlooked the immense history of philosophical debate that has and continues to take place. Tsoukas (1994) points to the fruitful differences in academic epistemological approach and questions epistemological differences in other workplaces. Cook and Brown (1999) also see a problem with the popular notion of tacit and explicit with calls for more work focusing on how situated knowing takes place in different organizations. Others have found that knowing is not always the case and believing something to be the case is the only prerequisite for action. Much has been gained from raising awareness of the content of knowledge but now we need to look more closely at how that content is warranted in the workplace.

### ***Knowledge Epistemology Summary***

This section looked at three approaches to knowledge epistemology: in historical terms, academic and in organisations. Firstly, historically, Plato began the epistemological debate claiming knowledge of objects was impossible. Aristotle denied this was the case and launched the practice of observation and investigation. The debate as to how we know what we know, how much can we know and can we be sure we are correct has



continued to the present day. Thus, secondly this section has featured the expertise in epistemological debate found in academia. The ways of knowing in medicine, natural sciences, education, and business and other academic schools are being challenged. Finally, the third section has shown that this challenging debate has now tentatively commenced in organisations.

## Knowledge and Context

An interest in knowledge has risen in prominence in many organisations as it is increasingly seen as a source of competitive advantage in a rapidly changing economy and is not just a fashionable passing trend (Scarbrough and Swan, 2001, Brown and Duguid, 1998). There is growing recognition that employees knowledge can benefit the organisation and much work has taken place concentrating on the content of knowledge in large organisations. Despres and Chauval (2000) point to a developing categorisation that is dividing studies focusing on knowledge in industry. Context is identified as a significant variable in this debate (Tsoukas and Vladimirou, 2001, Bohm, 2000).

Boyd and Wild (1996) acknowledged different maps of reality within the building construction industry and proposed that sectoral differences needed to be explored further. A point that was taken up by Appleyard (2002) who concludes that knowledge flows in the semi-conductor industry were divided by national differences between Japanese and American institutions. Leonard (1995) identified conflicting realities across functions but within the same sector whilst Almeida and Kogut (1999) point to regional differences. Knowledge is about drawing distinctions within a domain of action (Tsoukas and Vladimirou, 2001). Knowledge is about personal and social constructs that fit within a *range of convenience* (Kelly, 1963).

The work of Tsoukas (1996) and Tsoukas and Vladimirou (2001) develop a concept of organizational knowledge that draws upon individual views of reality and knowledge as an art (Polanyi, 1962) rather than a pure science within the context of a large firm. This

work in large firms is valuable but detracts from a focus on small scale enterprise. The increase in technological change, outsourcing and the changing structure of organisations has resulted in an increase in small firms.

### Small Firms

Research in small firms is complicated by the lack of definition. It is difficult when for example Galbraith (1998) can describe Jaguar, Saab and Mazda as small niche firms. The criteria adopted by the European Commission are now in widespread use and is followed for this study. Thus all references to small firm also include the European term of Micro business. As from 31 December 1997 the Commission adopted the following definition (See Figure 3) across all member states:

FIGURE 3

#### European Community SME Criterion

EC SME Criterion	Micro	Small	Medium
Max. number of employees	10	50	250
Max. annual balance sheet total	-	5 m ecu	27 m ecu
Max. annual turnover	-	7 m ecu	40 m ecu
Max. % owned by one, or jointly by several, enterprises not satisfying the same criteria		25%	25%

Current literature, fails to appreciate the constraints on small firms. Davenport and Prusak (1995, p.17) draw an image of owner managers and employees working in small firms (defined as employing less than three hundred people) knowing each other so well they can 'just walk across the hall', if in need of particular knowledge in relation to an



aspect of the business. An idealistic image of conviviality, openness and shared mindset indicates a lack of understanding of the resource constraints still endured by many small firms (Wickert and Herschel, 2001, Sparrow, 1999). The issues faced by small firms are not a scaled down replica of a large firm (Sparrow, 2000).

A further misconception portrays the smaller company as a happy family of fulfilled individuals. Research indicates that small firm management and employees consistently contradict this image (Jones and Tilley, 2003). Small and medium sized enterprises (SMEs) have been seen to have a mechanistic approach to knowledge construction with less emphasis on social interaction questioning the popular notion of small firms as a happy close interactive family (McAdam and Reid, 2001). It is a misnomer that employees form close relationships just because the firm has a small number of employees (Wickert and Herschel, 2001).

The grounds for knowledge are not simplified because of the small number of people involved. Small companies face a problem of insufficient key staff that crossover responsibilities (Wickert and Herschel, 2001). In a large firm groups of people are linked by their background and profession, for example the accounts department in a large firm may employ the same number of people as many a small firm. The accounts staff are all likely to have some background in numeracy, IT, communication and higher or further education. Such groups of employees are metaphorically described as functional knowledge silos with different cultural perceptions (Currie and Kerrin, 2003). Likewise academia is organised into groups of people with a common interest who are able to work together in advancing their specialist knowledge not the highly differentiated

psychological work contracts found in small firms (Mohrman and Lawler, 1998). The small firm situation is seen as representing a challenging laboratory in which to test knowledge construction.

In a small firm twenty people may represent twenty different functions requiring a wide assortment of skills, qualifications, experience. As an example, consider a small firm bookkeeper who is unsupported internally by others familiar with book keeping. The bookkeeper's knowledge of book keeping is only furthered through external relationships or knowledge artifacts. This book keeper, perhaps a positivist, has always taken comfort in numbers, seeking patterns and regularities as recognised in the physical sciences as a means of understanding their word (Denscombe, 1998).

In contrast the same small firm employs one graphic designer, a versatile and imaginative individual who considers numbers as only a part of the picture. After four years at a UK university the graphic designer previously completed a thesis using action research and case studies. The book keeper and the graphic designer are employed by an owner manager who left school at sixteen, writes little down but is an extremely sociable and charismatic character, although perhaps a little gullible. Four other people work in this fictional small company – all different. The context for knowledge construction in this hypothetical example is a multi-dimensional laboratory.

Thus a small firm may have a small number of people but are they analytical scientist, conceptual theorists, conceptual humanist or particular humanist (Jung, 1971)? It should not be presumed that small firm employees typify any one specific knowledge type. We



should not presume that if employees are working in close proximity this will guarantee a commonality in the construction of their knowledge.

Knowledge is context specific and affected by genetically different individuals, formal/informal groups, communities, organizations, trade groups, industry and nation (Bohm, 2000). Full disclosure of context is useful in studies of knowledge in the workplace. Research involving knowledge in organisations needs to cover a smaller bounded context in order to reveal more about the subject (Alvesson and Kärreman, 2001, Geertz, 1973).

There is a need to study the grounds for knowledge and therefore the scope for knowledge as peculiar to the small firm due to the distinctiveness of small business in comparison with the larger business (Sparrow, 1999, Ram et al, 1997, O'Farrell and Hitchens, 1988). The nature and scale of the impediments that constrain the small firm are fundamentally different from those of the large firm. A view further supported by Carland et al (1984). The sum of knowledge in the small firm is by its very definition reduced by the number of employees.

The Aston Group (see Pugh et al 1969 (a) and 1969 (b)) suggest that size is the most powerful predictor of specialisation, use of procedures and reliance on paperwork. That is, the larger the organisation the more likely it was to adopt, or need, a mechanistic structure. Current literature upholds that knowledge formation, transfer and storage in small firms are simplified by the lack of specialisation, procedure and paperwork. It is presumed that a firm with a few employees is in a preferential position with regard to the



knowledge issue because all employees will proceed with knowing in the same way. Knowledge is not fitting with a mechanistic framework of centralized bureaucratic control and appreciating different warranting mechanisms in use is relevant to all firms regardless of size (Brown and Duguid, 1998). Warranting mechanisms are the standards of judgement whereby people distinguish what is worthwhile and valid from what is not. Contrary to the view held by Davenport and Prusak (1998) size does not simplify knowledge or warranting processes.

In a small firm the scope to extend the knowledge base has to come from either maximising external relations or extending the knowledge sharing and creative abilities and opportunities within the firm. Small firms in the service sector are seen to rely heavily on knowledge derived from personal links, associate and business contacts with the issue of trust central to the management of such relationships (Boussara and Deakins, 2000, Ram, 1999, Goffee and Scase, 1995). The context from whence knowledge is created, disseminated and personalised has relevance (Hollway, 1991, Szulanski, 1996 and Scarbrough and Swan, 1999).

I start from the premiss that there is no such thing as knowledge in isolation from its condition of production and reproduction (Hollway, 1991, p.7)

And

... the cases show quite clearly that knowledge management practices need to be appropriate to the particular institutional and organisational contexts

(Scarbrough and Swan, 1999, p.10)

The scope to create new knowledge from a marginal labour market (Carson, 1991) is a specific impediment for the knowledge capabilities of small firm employees. The small

firm has a different employee profile, not just in academic ability but in aspiration and motivation. Significantly, a primary impediment to knowledge transfer is the recipient's lack of absorptive capacity (Szulanski, 1996). A new socio-economic class is being created from the segregation of robust innovative companies able to invest in their employees and those excluded from learning, training, education and discussion groups whilst employed in the smaller low-road companies (Neef, 1999).

The lack of resources in small firms prevents the 'condition of redundancy' (Nonaka and Takeuchi, 1995, p.80) and the social embodiment of knowledge. The condition of redundancy does not, in this instance refer to the loss of employment. It is the overlapping of information connected to the business activity, management and whole company that may not be needed immediately. It is an interchange between hierarchy and non-hierarchy, which assists the transfer of tacit knowledge across functional boundaries. In Nonaka and Takeuchi's opinion the western hemisphere are disadvantaged due to the mindset of 'need to know'. An over-emphasis on redundancy can lead to information overload but an element of redundancy can promote the creation of new perspectives and new grounds for knowledge.

The small firm literature has focused on knowledge networks (Mitra, 1998, Belotti and Tunalv, 1999, Kautz and Thaysen, 1999) knowledge synonymous with learning (Chaston, 2000) and knowledge creation during product innovation (Corti and Corrado, 2000). An exception is the comparative studies produced by McAdam and Reid (2001) and McAdam and McCreedy (1999). McAdam and Reid (2001) stand out as complementing the researcher's interest in the formation of knowledge for employees in



the small firm. How do they know what they know rather than what do they know. Their research has been based on a modification of Demarest's (1997) knowledge management model, which defines knowledge construction as a combination of the scientific and the social paradigm. Their comparative study is drawn from the perceptions of selected employees in both the large and small firm. The survey was, 'not used to establish reasons and meanings' (McAdam and Reid, 2001, p.233) but establishes key trends at a meta level. The workshops involved individuals who expressed an interest (in the original survey) in participating. The workshops were formed to negotiate meaning and develop constructs (Easterby-Smith and Thorpe, 1997) in relation to knowledge management. It is not clear in the paper, precisely what position in the respective organisations the participants in the workshop or the respondents to the survey held. This exclusion of representatives from different roles in the company weakens the findings. However, this original work has concentrated on improving the understanding of the philosophy of knowledge and how this works with the learning opportunities in small firms by comparing them with large firms. The workshops revealed a limited vocabulary for the notion of knowledge from the participants. It is essential that research encourage participants to express themselves in whatever vocabulary they have and does not preclude the meaning of participants due to a perceived limited vocabulary. The comparative study workshop combined individuals from large firms and SMEs, therefore a degree of intimidation and unfamiliarity with proceedings will have affected the workshop discussion.

The participants from SMEs construed knowledge as being scientific facts and hard information with far less emphasis on the social tacit nature of knowledge. Knowledge is



denoted, as referring to the firm's Information Technology and the tools and methods. Primarily the SME senior management captured knowledge but no one in particular had this responsibility for capturing knowledge. The irresponsible attitude of management in small firms in respect of managing the knowledge internal the firms was also recorded by Holliday (1995) in her ethnographic study of three firms;

Harry is already over the age of retirement and carries all the information in his head. (p.92)

SMEs were asked what emphasis they would place on knowledge practices and they responded it would be on the basis of immediate financial gain in respect of increased market share. The SME participants were all looking for a direct emphasis on the market whereas the large organisation participants looked for improvements to efficiency, quality and costs.

An exploration of the limited literature in the specialist domain of knowledge and the small firm is predominantly restricted to journal articles or conference working papers. Beard and Blackburn (1997) make the first association between knowledge and the small firm citing Castells (1989). Their literature review and research agenda focused on Intellectual Property Rights and the small firm but also included a brief précis of knowledge organisations. It acknowledges the view that there is a need to pay attention to the tacit knowledge in small firms and not just focus on the creation of patent stores.

Bryson (1997) also inspired by Castells, but a later publication (Castells, 1996), optimistically refers to 'New Knowledge Workers' in the small firm environment. However, this reference to new knowledge workers is not a description of employees

rather it is the Personal Business Advisors (PBAs) employed by the government led Business Link initiative who are seen as the providers of knowledge. Emphasis is on the growth in availability of business service professionals to the small firm sector and in particular a critique of the Business Link provision. The transfer of PBAs knowledge is deemed less effective as that seen in large firms. The small firm is seen to possess limited capital resources, limited internal management and the added disadvantage of time pressures restricting the transfer of knowledge (Bryson, 1997). Ram (1994) agrees with these limitations and has found that the small firm owner-manager is engaged constantly in the day-to-day running of the business and has little time to analyse the knowledge deficiencies in the firm.

Without acknowledging the gap in our knowledge of knowledge in small firms, Bryson (1997) hints at the need for knowledge management tools in the small firm. Large firms have begun to develop the expertise in managing the knowledge derived from external advisors that enters or is contained in the firm. The large firm strategic management style recognises the demand for the efficient and effective transfer of an ever-expanding knowledge pool. The owner manager and key personnel in small firms experience sporadic relationships with external sources of knowledge and can fail to optimise the value of any new knowledge that is accessible (Boussouara and Deakins, 2000, Belotti and Tunalv, 1999, Bryson, 1997). Managing the value that can be derived from knowledge is a challenge for all businesses – large and small (Sparrow, 2000).

Blackburn and Kitching (1998) expand on the earlier work of Beard and Blackburn (1997) and examine whether public policy could be altered to change the attitude of small firm owner-managers to Intellectual Property Rights. The emphasis once again is



on the control of existing specialist and confidential knowledge content but distinguishes between intellectual capital and intellectual property. The latter is seen, as knowledge that is worthy of protection by law and the former is knowledge that may create a competitive advantage but not protected by law. The paper ignores the issue of the management of intellectual capital and concentrates on the management of intellectual property. The use of the term management appears to equate particularly to control and protect. The issues addressed relate to specific knowledge that is already in the firm and explicit.

Blackburn and Kitching (1998) found that 71% of the sample surveyed felt their knowledge was of a specialist or confidential nature and it's security threatened by key employees leaving the firm and copying by competitors. Despite this paranoia formal protection practices are seldom used and only appear to emerge as firms expand. The owner manager prefers to rely on informal protective measures that are seen as less costly and complex.

Blackburn and Kitching suggest that firms move along a continuum of protective practices ranging from the left of the continuum as doing nothing and to the far right, the registration of specific Intellectual Property measures. Their research does not support any advantage in moving towards the right and appears to support the view that maintaining a lead time advantage the owner-manager can obviate the need for protective measures altogether.



Knowledge that is shared based on trust requires an extensive investment in interpersonal relationships, affecting both large and small enterprises (Boussara and Deakins, 2000, Boisot, 1999). Employees in large firms have attempted to avoid the issue of knowledge exchanged outside of the bureaucratic contract driven arena and encouraged the containerisation of their knowledge. However, this control culture impinges on the flow of knowledge internal and external the firm. Boisot (1999) provides the example of Italian firm Benetton:

The firm successfully fostered a climate of collaboration with suppliers and subcontractors based on a culture of trust and long-standing personal relationships. However, it faced a major challenge when it expanded into the USA, where the prevailing cultural orientation was towards markets and impersonal arm's length contracting (p.142)

Small firms are encouraged to build upon trust in the competence of external advisers and develop trust in group identification (Boussouara and Deakins, 2000). Trust is seen to be pertinent to knowledge warranting.

Research into grounds for knowledge in large firms has commenced (Tsoukas and Vladimirou, 2001). It is not unusual for new research themes to commence in a sector which attracts funding and interest. Small firm literature has consistently encouraged their subjects to adopt variations of management techniques first developed in large corporations. For example, a proficiency in management accounting (Nayak and Greenfield, 1994) or total quality management (Ghobadian and Galleary, 1997). The more recent examples, include the use of benchmarking (Cassell, Nadin and Gray, 2001), and control techniques (Reynolds, Day and Lancaster, 2001). Thus despite the consensus that small firms are not just little big firms there remains support for the idea

of small firms utilising many of the management principles applied first in large firms. It is appropriate that research into knowledge epistemology in large firms is now complemented by work in the small firm sector (Corti and Corrado, 2000). Small firms deserve attention due to their contribution to the world economy. The misconception that they will be swept away by technology has not held true and small firms still matter (Brown and Duguid, 1998).

### **Sectoral Foci**

In a global economic community, commerce needs to draw on knowledge with minimal knowledge boundaries and across existing knowledge spaces. Autopoiesis, a cognitive theory originated by Maturana and Varela (1980) emphasises *interpretation* within a boundary. Autopoiesis means self-producing systems; an autopoietic system's production of its own components provides it with a 'topological boundary' set down within the space in which it is recognized. Critics of autopoiesis insist the existence and character of social systems do not exhibit any such topological boundary and designated boundaries do not mark social spaces and individual roles in society crossover communities. Yet much work has taken place to suggest the manner of knowing is affected by regional and contextual differences and the autopoiesis process of self description used to identify boundaries (Boussara and Deakins, 2000, Almeida and Kogut, 1999). Von Krogh and Roos (1996) provide an example of autopoiesis - unification of knowledge between a practitioner and two academic professors but the individuality of interpretation for the participants within their topological spaces.



Interest in organisational knowledge is showing signs of sectoral foci to suit the traditional paradigm and culture of the sector, for example the dichotomy between engineering, chemicals, food production, teaching, leisure and service industries. There is a marked interest in specific companies redefined as knowledge intensive firms (KIFs) (Starbuck, 1992). A typical example of a KIF would be a large consultancy corporation (Alvesson, 1993).

The participants defined as unit of analysis are employed in the automotive sector and therefore it appeared appropriate to tease out the specific work that has and is taking place in this sector concerning organisational knowledge. The strategic role of knowledge for firms seeking competitive advantage has involved all automotive sectors including formula one racing (Jenkins and Floyd, 1998). This is not to recommend the automotive sector should have a sector response to knowledge, concerns have already been raised with regard to a standardisation of knowledge practices (Dove, 1999). An appropriate response is peculiar to each specific firm.

### **Automotive sector**

Automotive manufacturers are seen as loosely coupled organisations outsourcing production and detail engineering with both contract and in-house research and design responsibility (Brusoni et al, 2001). The automotive sector has undergone a global transformation. The manufacturers are ever-seeking a more competitive means of resourcing research, design, production and distribution thus are forced to move locations to the most economic producers. In the past geographic locations were strongly



linked to the sector, for example, the West Midlands in the UK and Detroit in the USA. The knowledge within the sector became located in an area of the country (similar to the IT knowledge linked to the Silicon Valley). The knowledge relevant to the automotive sector is now global involving many different languages, cultures and religions. The commonality of the epistemology of knowledge across such a wide gulf requires much research.

The traditional means of transferring knowledge within this sector has led to staid impression and it has become apparent that management are now keen to share their knowledge externally. Yet, there remains a custom of the engineering apprenticeship as the means of learning the craft and skills of the trade. Apprenticeship is an example of tacit-tacit knowledge transfer but suffers the consequences of staid imitation.

You follow your master because you trust his manner of doing things even when you cannot analyse and account in detail for its effectiveness. By watching the master and emulating his efforts in the presence of his example, the apprentice learns unconsciously, picks up the rules of the art, including those, which are not explicitly known to the master himself. These hidden rules can be assimilated only by a person who surrenders himself uncritically to the imitation of another.

(Polanyi, 1998, p.53)

The automotive sector is therefore in the position of employing thousands of people who know what they know because of a master-apprentice relationship. Stakeholders are now appreciating the dangers of not recognising the effect of apprenticeship schemes on the organisation's knowledge base.

Research indicates that management in automotive firms are now active in seeking knowledge from alliances and networking. The route to an improved competitive advantage was seen to be the plausible knowledge alliances between the motor manufacturers (Badaracco, 1991).

Von Krogh and Roos (1996) doubt the benefit of knowledge transfer within and between organisations. They see any positive effects of transfer threatened by any unintended knowledge transfer or poor assessment of potential partners knowledge. All alliances first need to overcome the issues of beneficiary and trust (Badaracco, 1991). That is, an understanding of the gains, which may vary, resulting from any alliance. The alliance needs to be structured to ensure all parties sense the beneficial gain has been accomplished. Building trust between the parties is crucial to knowledge development.

Automotive component suppliers working within manufacturers supply chains aim to forge strong ties in order to ensure continuity of supply (Hansen, 1999). As part of this close relationship, manufacturers have been seen to actively encourage component suppliers to adopt their management techniques and standards. The movement of slave to partner in this relationship has been slow to extend from Japan to Western companies (Maxton and Wormald, 1994). Japanese automotive firms aim to harness efforts to improve capabilities whereas partnerships in western firms often break down with a return to the competitive/adversarial paradigm. Building trust becomes a problematic issue when there is a history of partnership breakdown.

### *Summary*

This section has summarised the available literature that demonstrates the contextual nature of knowledge. It highlights the imbalance in knowledge literature weighted towards large firms and the tentative interest shown in small firms. The latter remains focused on knowledge content and precludes knowledge epistemology. It is interesting to note that despite the limited work that has and is taking place, it is the IT and automotive sectors that frequently feature as case study material. There does appear to be a consensus in the small firm literature that knowledge, in some form, is a vital issue that all firms regardless of size need to address. It is promising that in the specialist small firm literature there is an indication that the fundamental question of the meaning of knowledge (McAdam and Reid, 2001) has been recognised but further research is demanded. Knowledge development needs a laboratory (Kelly, 1963) and this research chooses to focus on the neglected area of small firms and in particular a small manufacturing firm facing the challenges associated with a highly competitive global automotive sector.



## **Knowledge applicable to all**

Two of the objectives of this research appear to offer an ambiguous view of knowledge in the workplace. One was to consider knowledge as an issue relevant to all employees and management and not just to reify knowledge workers (Thompson et al, 2001). The second was to show how small firm participants perceive how a knowledge icon knows what they know, thus acknowledging that knowledge is associated with everyone but to different degrees.

It is a study centring on a small firm and not on entrepreneurs as it was felt that sufficient attention has been loaded on this individual as the 'unit of analysis' (Miles and Huberman, 1994, p.25). The entrepreneur eulogised by the 1970's Thatcher Government and lauded by the media has a dark side (De Vries, 1989 and McKenna, 1996) that is all too often ignored. The research emphasis on the hero entrepreneur has failed to recognise the people employed under such leadership. In place of an entrepreneur focus there is a need for more work on the multiple stories within a single small business venture. Small firm employees are a 'somewhat neglected group' (Curran and Blackburn, 2001, p.71).

Small firm research has particularly laboured undue attention on the grand narrative of the hero entrepreneur. This study is directed towards small firms who may or may not be entrepreneurial and who may or may not be led by an entrepreneur. A study of the small firm literature is complicated by the synonymous use of the term entrepreneur and

owner manager. Gibb and Davies (1991) carefully consider the use of the term entrepreneur compared to the approach taken by Hill and McGowan (1999). Despite considerable academic research there remains no distinct typology of the entrepreneur in terms of character, traits, or behaviour. Yet, Hill and McGowan are willing to list the key personality and behavioural attributes of an entrepreneur without supporting research evidence or relevant literature references 'commitment, determination, vision, energy, tolerance of risk and ambition'(p.3). Such an all-encompassing definition appears at odds with the tone of their article and emphasis on the individuality of the entrepreneurial small firm.

There appears a consensus in the literature to the entrepreneurial motive found in all individuals who take the decisive step of starting-up a business. It is now recognised that this entrepreneurial behaviour is not seen in everyone and many of us prefer to remain non-entrepreneurial. The debate which began with (Schumpeter, 1942) and contradicted by (McLelland, 1961) as to whether entrepreneurs are born or made has received considerable attention in small firm research. The entrepreneurial characteristic is derived from a whole host of variables and much work has taken place in an effort to single out the common personality traits of individuals who are determined as entrepreneurs.

Watson and Ponthieu (1995) hoped to alter the focus away from the examination of the personality traits to the understanding of entrepreneurial effectiveness and the overall entrepreneurship system. The commonly defined psychological characteristics, risk-taking, innovativeness, need for achievement, locus-of-control and personal values

remain inconsistent (Watson and Ponthieu, 1995). Their encouraging discovery was the limited focus on individual personality traits provided by the respondents and the concentration on broader aspects of the entrepreneurial system, for example, ability to analyse the environment and information acquisition.

Within the small business research community there does appear to be a consensus as to the meaning of entrepreneurship as a process but confusion as to what can be understood by the tangible term of entrepreneur. The need to define a term is an indication of the preference for boundaries in research (Stake, 1994). The entrepreneur has obviously initiated some form of entrepreneurial process in order to be identified as an entrepreneur. However, this is not to say that the individual has a constant need to be part of an entrepreneurial process. This was recognised in the work of Carland et al (1984) who defined the small business venture as any business that is independently owned and operated, not dominant in its field, and does not engage in any new marketing or innovative practices.

They defined the entrepreneurial venture as one that engages in the principal goals of profitability and growth and the business is characterised by innovative strategic practices. Carland then expand their definitions to describe the individuals who lead the small firm as either a small business owner or an entrepreneur. The small business owner is an individual who establishes and manages a business for the principal purpose of furthering personal goals. Carland et al concludes that the entrepreneur is an individual who establishes a business for the principal purposes of profit and growth. The establishment of a business is in itself an entrepreneurial activity but it is the



principal purpose of the business that delineates whether the individual or individuals are small business owners or entrepreneurs.

Small business owner or entrepreneur they both will at some point consider employing others. It is the 'others' that this study is particularly interested in. They are an ignored entity and only rarely included in any research study.

..much small business research, for example, concentrates on the motivations and actions of just one person, the entrepreneur or owner-manager, but invariably others are involved who also shape the enterprise and its destiny.

(Curran and Blackburn, 2001, p.5)

When employees are recruited it is because they have knowledge and skills in an area needed by their employer. For example a packer is acquainted with packing (knowledge of), plus a deeper embeddedness with packing (knowledge about). The packer knows the 'facts' related to packing (knowledge that) and is a packer (knowledge how). An employer may ask do you know how to pack but may not pursue the line of questioning relating to how do you know what you know about packing. The closest the employer may get to this issue is in the initial interview. Twelve months on the packer's knowledge in relation to packing can change but few employers will stop to ask how it is you *now* know what you know about packing. Too many little people (Boje, 2001) in firms both large and small are labelled as doers and not thinkers (Thompson et al, 2001, Brown and Duguid, 1998, Kusterer, 1978).

Not only are the little people frequently ignored as contributors to knowledge production within their immediate peer group but they are also underestimated for their contribution

to social and intellectual capital within their wider workplace communities (Thompson et al, 2001, Brown and Duguid, 2000). All employees are part of a social framework and as such are not necessarily thinking reflectively of their position in the framework but are participating. They participate in a language-using world that Wittgenstein (1953) would argue is a logical stop for ontological inquiry. They just know what they know because they are getting on with life. This study sets out to ask individual employees who form a social community, whose only apparent objective commonality is their employer, how they know what they know. It would be inappropriate to select employees based on any presumption that some would be more accurate or valuable in their offerings to this study.

But this work accepts that some employees are considered more knowledgeable than others. In society we all have knowledge in certain areas but some individuals are recognised as being particularly knowledgeable whilst others are also considered to have the right to be sure (Ayer, 1956). Orr (1996) has shown that Xerox technicians call upon the knowledge of other technicians due to their reputation and competence. Or in more generalist terms, 'People develop a sense of where the real expertise lies' (Hansen and von Oetinger, 2000, p.111).

With regard to a central position in driving a knowledge based view of the firm it has been argued that communication competencies of technical communicators place that particular vocation in a strong position (Wick, 2000). They know what they know because of their attention to representing knowledge in a manner that will prove effective. Within a workplace there will be experts in their field and expert technical

communicators (although, the latter may not necessarily be so in a small firm) but also individuals who dominate knowledge sharing because of their status or personality.

The process of knowledge sharing is a social activity which revolves around key organizational managers such as entrepreneur-owner, the chief executive, or senior managers with dominating personalities.

(Shrivastava, 1983, p.19)

A contradiction exists between the dependency on key individuals and the idea of sharing knowledge. Sharing implies a sense of equality and diplomacy even the word knowledge tends to go against hierarchy and authority based on any formal position (Alvesson and Kärreman, 2001). Accepting the key role of certain individuals is certain to affect this sharing process.

In the workplace we commonly identify others with potential knowledge resources (Currie and Kerrin, 2003). In society we uphold certain individuals to represent the very notion of knowledge. It would be useful to divulge management and employees construction of how these knowledge icons are perceived to know what they know.

### *Summary*

Small firm research has dwelled on the owner manager or entrepreneur who is undoubtedly in a pivotal position but this study argues that there are other valuable positions. All small firm employees regardless of status still have something they could contribute on the notion of knowledge epistemology. Knowledge is applicable to all but the notion of knowledge appears more applicable to some. If we could gain an insight



into how those eulogised for their knowledge know what they know management and employees may have an alternative template to consider.

## **Personal and/or Social Domain**

There is a great deal we cannot know about the world without relying on others so focusing on the individual in a privileged position is somewhat self-absorbing considering nobody lives in total isolation (Audi, 1998).

Boisot (1998), Nonaka and Takeuchi, (1995) and Simon (1991) follow the Cartesian philosophy of Descartes (see Weissman, 1996) declaring the position of individuals as privileged (Cook and Brown, 1999). Their theoretical frames incorporate a box or label entitled personal knowledge or similar. This suggests that organizational knowledge consists of autonomous 'blocks' of knowledge as each employee's objective possession (Cook and Brown, 1999, Brown and Duguid, 1991). With each employee standing like a knowledge island surrounded by other knowledge islands all possessing different knowledge but all composed identically. Knowledge is frequently determined as the *property of agents* accessed by the perceptual and conceptual filters that exist due to existing knowledge held (Dixon, 1999, Boisot, 1998). Employees and management are getting on with living in a social world and it is that existence that provides evidential warranties. The work of Wenger (1999), von Krogh and Roos (1995) and Brown and Duguid (1998) take *the group* as a primary unit of analysis and thus something to be investigated in its own right. This study examines both individuals and groups as both

entities have their own *ways of knowing* (Cook and Brown, 1999, Garud and Rappa, 1994).

Our knowing is too big, too rich, too ancient and too connected for us to be the source of it individually.

(Wenger, 1999, p.142)

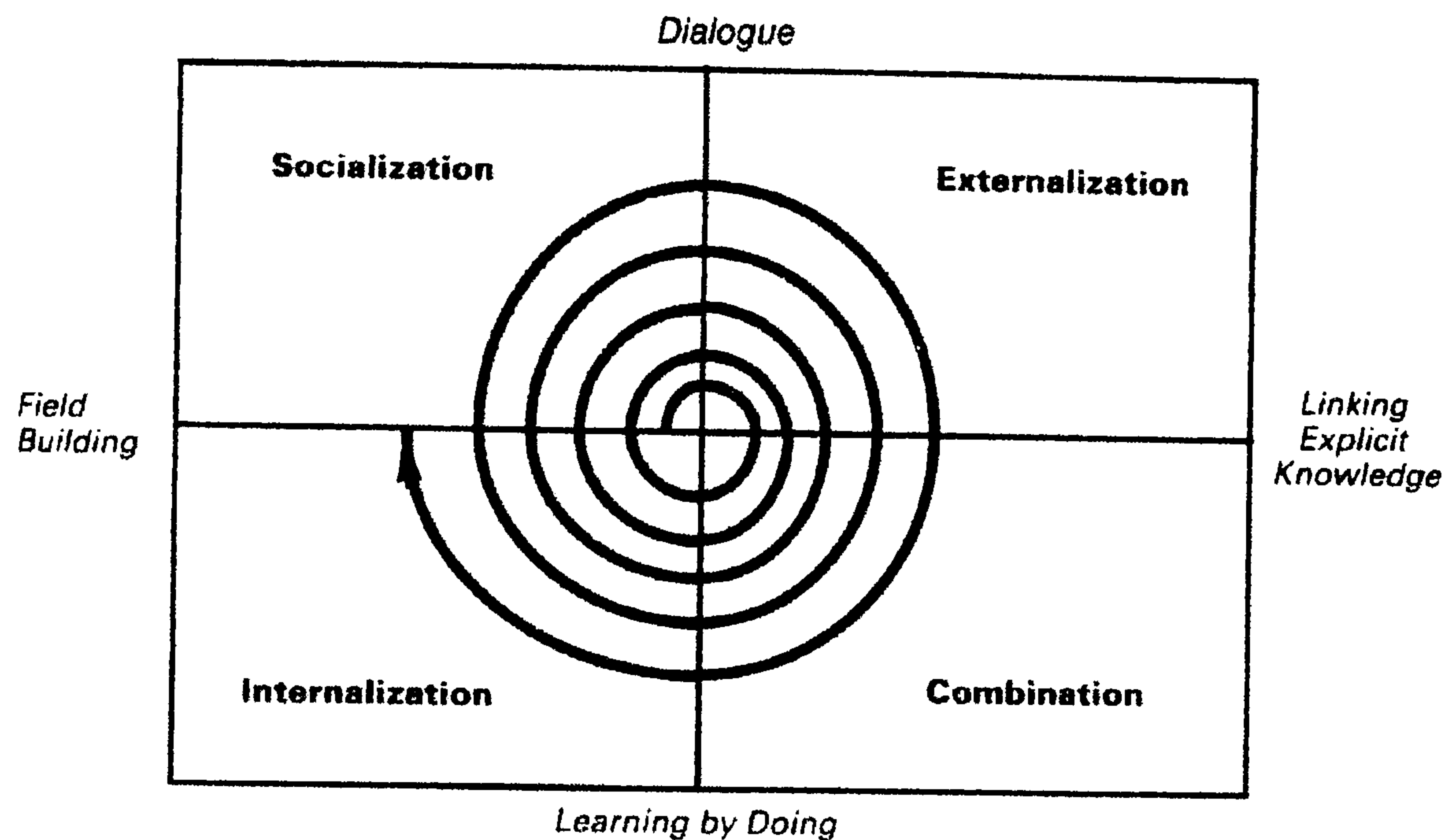
This tendency to ignore a social dimension is influenced by their interpretation of Polanyi (1962) and the concept of tacit knowledge which emphasises the personal involvement of the knower in all acts of understanding as an argument against what Polanyi saw as an improper episteme based on scientific detachment. His focus on tacit knowledge has been explored and upheld as a determinant to knowledge management practice. A key to gaining competitive advantage is accessing this private and highly individual tacit knowledge so that it can be shared (Nonaka and Takeuchi, 1995).

Creating new knowledge in organisations is seen by some as the interplay between tacit and explicit knowledge (Nonaka and Takeuchi, 1995). At the heart of this notion is that all things tacit may be transferred into explicit and all things social become personalised (See Figure 4). First note the interplay between tacit and tacit knowledge, *socialization*, represented by the master-apprentice scenario. Secondly, sees interaction between tacit and explicit knowledge, *externalisation*, represented by dialogue and collective reflection. Thirdly, interplay between explicit and explicit knowledge, *combination*, represented by formal learning situations. Finally, interchange that takes place between explicit and tacit knowledge, *internalisation*, represented by the practice of learning by doing. Nonaka and Takeuchi regard the social interplay as a continuous spiral that

commences with a field of interaction, which leads to dialogue and defines links with explicit knowledge and results in the action of learning by doing.

FIGURE 4

The Knowledge Spiral (Nonaka and Takeuchi: 1995, p.71)



The Western Hemisphere has relied on the combination aspect of knowledge, as a prescription to the various roles in society and the organisational hierarchy. The more adept one is at recalling existing explicit knowledge then the greater the opportunity to acquire qualifications and status. This is compared with the management approach taken by CEO Yoshio Maruta at Kao Corporation, who argues that:

...information differentials among employees should not become the source of authority or power.

(Nonaka and Takeuchi, 1995, p.178)



Turning to the commercial environment of the small firm it is questionable whether available resources enable sufficient externalisation or combination via access to formal learning situations.

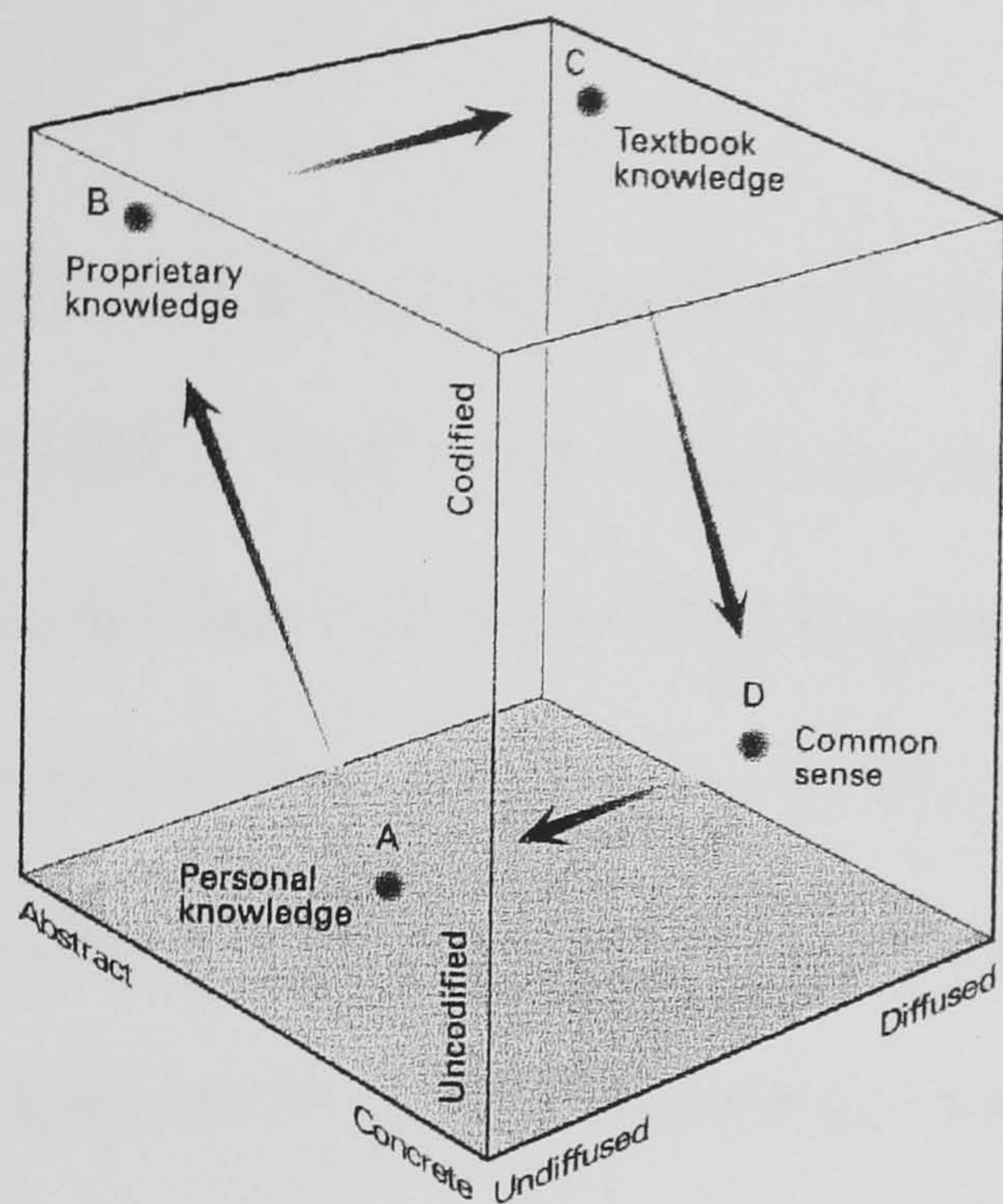
Nonaka and Takeuchi (1995) aim to inform the reader of knowledge creation processes and in so doing reveal their own attitude towards knowledge epistemology. They see knowledge as fundamentally a social activity with the individual employee appearing to be in control and supported by the externalisation and combination links to books, education, computers or other means of information storage (Nonaka and Takeuchi, 1995).

A further example displaying the central attention on the individual employee is Boisot's conceptual framework of the I-Space (See Figure 5). Diffusion of knowledge calls for codification and abstraction processes at an individual level (Boisot, 1998). Codification provides a category into which we can place new data, a process of giving *form* to phenomena. Those with a particularly expert refined codification system will have greater cognitive filters in the analysis of new data. Boisot uses the example of the olfactory discriminations of wine experts providing greater categorisation than non-experts. Abstraction is a form of reductionism, defining the structures that underlie the *form* of the categorisation system. Diffusibility aims to question: Is the message received the same as the message sent? Has the message been understood? Has the message been acted upon as intended?



FIGURE 5

Movement of Knowledge in the I-Space (Boisot, 1998)



The I-Space is a data field in which personal knowledge becomes proprietary knowledge. The proprietary knowledge becomes textbook knowledge. Textbook knowledge becomes common sense. The region A of personal knowledge represents the highly personal biographical or occupational knowledge. Region B or proprietary knowledge represents the mental material that has been shared by the individual with others and thus reached a general domain. The knowledge in this general domain is transferred into the representations of knowledge, Region C, books, instruction manuals, journals, newspapers etc. The area D represents the internalization of this textbook knowledge into a commonly shared knowledge.

However, Boisot differs from Nonaka and Takeuchi (1995) in determining a common socially formed knowledge but one that co-exists with a unique individual slant:



....each of us passes this data through cognitive filters that have been tuned by our unique biographical circumstances. We thus convert a good part of what is taken to be a shared common-sense world back into what may be highly personal and idiosyncratic experiences.

(Boisot, 1998, p.58)

There are two different forms of tacit knowledge omitted from the Nonaka and Takeuchi knowledge model (Boisot, 1998). Firstly, the things that are not represented because everybody understands them and takes the knowledge for granted. This could be seen as a social internalization of knowledge that fails to continue the spiral of knowledge creation. It can be seen in routine, habit and tradition. Secondly, things that nobody attempts to represent because nobody fully understands them, knowledge unable to develop a field of socialization.

What has been missed from the frequent citing of Polanyi (1962) is firstly his emphasis on individual *epistemology*. It is not just content of knowledge that is tacit but also each individuals approach to forming knowledge has a personal identity. Secondly, Polanyi (ibid.) claims personal knowledge is founded on language, communication, culture and society which cannot be described as individual activities. Thus personal knowledge co-exists in tandem with a social element. It is 'never isolated from social interaction' (Nonaka and Takeuchi, 1995, p.71). Individuality presents itself in the form of the ability to draw distinctions within a collective domain of action (Tsoukas and Vladimirou, 2001).

Concerned by the shortfall in the philosophical elucidation in connection with knowledge of the person and persons Hamlyn (1970) disputes the concept of solipsism



and calls for the recognition of the intersubjective scope of knowledge. He uses the example of 'pain' as having an intersubjective meaning as the public all understand the conditions under which the concept may be used even if we are not familiar with the individual's private meaning of pain. This intersubjective view is also contained in the writing of Kelly (1955) who considers the self as being the result of social forces. An initial examination of Kelly could incorrectly suggest the deeply individual subjective postulate of his Personal Construct Theory would not permit any sharing of common understanding to concede to elements of the real world. However, Kelly is emphatic in proposing that the theory be based on the integral relationship between individualism in tandem with sociality.

A simultaneous co-existence of individual and social realities was found by Garud and Rappa (1974) in their research into the development of cochlear implants. This supports a cultural integration of knowledge (Polanyi, 1962, Berger and Luckmann, 1991). A view that we live in a common world but one that permits a different *perspective* by each individual. We may question whether these different perspectives are synonymous with Polanyi's term 'personal knowledge' or Kelly's 'individuality corollary'.

In relation to knowledge content, it is accepted that as individuals nobody knows all there is to know at any given time. We accept knowledge content is socially distributed (Berger and Luckmann, 1991). We also need to consider that there are social mechanisms for validating information that will alter our knowledge state. Without social validation, information is left hanging unattached and void of meaning. During primary socialisation knowledge justification is linked to the social network of authority,

parent, guardian, and teacher (Berger and Luckmann, 1991). In secondary socialisation knowledge warranting mechanisms are also linked to a social network including the working environment. All knowing involves active participation, action, discussion and reflection (Wenger, 1999); even in reflection employees compare their picture with the imaginary picture of others. It is difficult to comprehend how knowledge therefore becomes an individual possession (Tsoukas and Vladimirou, 2001).

Research conducted in a small Danish software company by two individuals (Kautz and Thaysen, 1999) indicated the value of social interactive networking to enhance knowledge creation and transfer. A view also supported in some large firm knowledge research (Swan et al. 1999). Kautz and Thaysen concluded that knowledge is subjective enlightenment *and* a personal property. The creation of knowledge is continuously re-created and re-constituted through dynamic interactive social networking activity.

Dyer and Nobeoka (2000) make the same connection to the social environment in their study of sharing knowledge content in Toyota. This was an exploratory case study in Toyota to examine the knowledge-sharing routines developed by Toyota and its suppliers. Knowledge transfer is seen to be either routine or haphazard but in either case it needs motivated and self-interested employees and a variety of processes to work successfully. Dyer and Nobeoka recommend that the work processes are organised with different social groups to maximise the opportunity for knowledge sharing. In this particular case Toyota subsidised the rest of the network to ensure all those willing were able to participate. The subsidy took the form of resources and immense knowledge input from the Toyota employee participants. Thus to be isolated from the knowledge-

sharing process would be less beneficial than the perceived cost of contributing and therefore gaining from the network. The network created rules to avoid the attendance of 'free-riders', those who were happy to gain knowledge from others but unwilling to contribute. Dyer and Nobeoka (2000) identified a need to encourage employees to have an appreciation of the collective good of sharing knowledge rather than adopting the natural tendency to protect and with-hold know-how.

### *Summary*

This section explored whether knowledge research should be directed on individual employees or the complete social mix. The first option has been used in studies to produce frames for managing knowledge. These works have emphasised the notion of the empowered individual employee. Yet even in our personal construing of what is known we rely on a social world. The individual employee should not be looked at without reflecting on their wider social community. Work has commenced that realigns attention towards groups, teams and communities of workers. However, studies have concentrated on transferring knowledge content across the social mix and scant attention has been paid to the social construction of knowledge in the workplace. This study has as an objective the inclusion of both an individual and a social examination of grounds for knowledge. It opts not to prioritise the status of either entity as both views can offer an interesting insight for management.



## Communities of Practice

Work has taken place that appreciates the notion of a personal and social coexistence in knowledge appropriation (Tsoukas and Vladimirou, 2001, Badaracco, 1991, Lave and Wenger, 1991 and Orr, 1990). The most notable being Orr's study of Xerox technicians which portrays the knowledge formation processes occurring as part of a community even though each field technician invariably worked alone. The technicians sought validity from the community of technicians and not from the organization per se. The job of a Xerox technician could not be learned without the informal input of others (Orr, 1996). The Xerox technicians formed their own community of practice (Lave and Wenger, 1991).

Occupational communities represent bounded work cultures populated by people who share similar identities and values that transcend specific organizational settings.

(van Maanen and Barley, 1984, p.314)

It is not always the case that the community share work practices as with Orr's Xerox technicians. Communities may still draw together members whose day to day work activities can be quite different or even in different locations. It is not a requirement that a socially visible boundary exists (Lave and Wenger, 1991).

This thesis sees each participant not only as an individual but part of a community within the small firm (Orr, 1996). Small firms should not be defined as one complete community. A community of practice is different to a business or functional unit in that

separate communities can form within such a bounded objective context. There are three basic elements of a community of practice. Firstly they possess a sense of joint enterprise. Secondly, a community is formed around what matters to its members and thirdly the community has a particular manner of functioning (Wenger, 2000). This study considers that grounds for knowledge are also linked to a community.

....participation in an activity system about which participants share understandings concerning what they are doing and what that means in their lives and for their communities.

(Lave and Wenger, 1991, p.98)

Grounds for knowledge are considered as part of this activity system where community members share not only their knowledge content but also their knowledge warranting processes. Knowledge may mean different things in different contexts with different communities (Tsoukas and Vladimirou, 2001).

They are making sense of their community and sharing that sense-making (Brown and Duguid, 1998). The emphasis here is also on the members as activist and not management. The social structure and behaviour of that community is difficult to control because it is basically organic. A community has a social quality associated with background, long term commitments and a downplayed hierarchy (Alvesson and Karreman, 2001). Management can only calibrate what they understand well and the community is therefore beyond intervention by management. Attempts to intervene will lose that sense of community held by members. The best management can hope to impose is a fostering relationship (Brown and Duguid, 1998).

Wenger (1999) defines membership of a well functioning community of practice as deeply rewarding in providing a context to explore radically new insights without becoming isolated from the community. A well functioning community also ensures fluidity and change.

Knowledge content has been found to become set within a community, producing a sub-culture that inhibits knowledge sharing so much can be gained from moving people across to new communities (Currie and Kerrin, 2003). In a small firm it can be problematic to move people at all as each employee often specialises in a particular function and resources are constrained. Therefore a community may share common grounds for knowledge but those grounds are rarely tested or reconstrued in the light of new elements. There is no laboratory (Kelly, 1963).

A community of practice implies a certain level of choice whereas work teams are something different. Badaracco (1991) found knowledge content to be embedded in the groups of people who form a team. Teams operate with unspoken knowledge which is not essentially explicit to others observing the group, 'a tacit understanding of how the group work together' (Badaracco, 1991, p.86). Their knowledge episteme is dependent on the team participant's mutual respect, open-mindedness and judgement. Employees can be part of a management organised team and simultaneously part of an organic community.

Being part of a community may not always appear obvious to an employee. Likewise employees may belong to several communities simultaneously (Wenger, 1999). Sharing



knowledge across communities with strong close knit ties was found to be stronger than in communities with weak ties. But the advantage enjoyed by communities with weak ties is an ability to search for knowledge input (Hansen, 1999).

The whole concept of being part of a community or communities does not negate the individual. Once again there is a co-existence of individual and social knowledge construction. An individual may construe knowledge and justification in a certain manner even if no group does, whereas it is not possible that there be a group that has actual knowledge or justification when no individual member of that group has knowledge or justification for the proposition in question (Brown and Duguid, 1998).

### *Summary*

This study looks at the grounds for knowledge used by individuals and then seeks out communities who appear to share those constructions. It is argued that any shared grounds for knowledge should not be regarded as objective facts and causal explanations, but as a 'situated community based set of meanings' (Alvesson and Kärreman, 2001, p.1015). Divulging the shared meaning may assist management in determining what results may be achieved by particular approaches. For example if one community commonly construe how they know what they know by their personal close relationship with others. Whilst another community construe communicating with an expert as sufficient grounds for knowledge then management can gain from awareness of such differences. The communities that share common grounds for knowledge may differ from the management imposed team or functional divisions.

## Knowledge artifacts

Management have focused on extraction, codification and storage of knowledge in representational form therefore it was essential to examine artifacts in the context of knowledge. Knowledge representations play a part in knowledge validation but it was unclear what emphasis small firm management and employees place on them.

The aim of this study is to disclose the manner in which knowledge content is constructed and a final objective is to consider the role of knowledge artifacts (Shariq, 1998). Artifacts are tools that also play a part in grounds for knowledge claims. This work supports that of Shariq (ibid.) in seeing that human knowledge advancement is inseparable from our ability to develop and use tools that assist in creation, diffusion and storage of what we know. Knowledge represented in an explicit form is part of knowledge formation (Cook and Brown, 1999).

.....an activity system comprises the individual practitioner, the colleagues and co-workers of the workplace community, the conceptual and practical tools, and the shared objects as a unified dynamic whole.

Engestrom, Yrjo (1991, p.267)

A view that knowledge needs to be in the heads of individuals and not necessarily in any representation of knowledge (Dove, 1999) indicates a bias against the recent development in knowledge tools. But so called knowledge tools which give the impression that knowledge is an objective commodity to be trapped in a software package are misrepresenting a complex issue. The acquisition of knowledge may not, contrary to popular opinion be an explicit set of codifiable symbols. In stead, knowing

something consists of grasping paradigmatic kinds of situations and processes and testing them pragmatically for goodness- of- fit (Allix, 2003)

Some studies following the impact of knowledge tools in grounds for knowledge validation will struggle to keep pace with artifact development. However, small firms strain to resource new artifacts and do not have the range that is in daily use in many large firms.

....many small firms rely upon the physical and mental skills of their owners and employees rather than on expensive equipment.

(Scase and Goffee, 1987, p.17)

A small firm may have a networked PC system but it is unlikely to be used to its full potential. The volume of written information is restricted by the limited number of employees and the cost of producing documentation. Accessibility can also be a problem due to low levels of literacy and/or insufficient funds to train employees in the correct use of knowledge tools. Advanced software programmes to smooth the transfer of information may never receive attention due to their specialist nature. Who, for example, in a small resource stretched firm will take responsibility for installing a personnel record software package when nobody is aware of the requirement for such record keeping and nobody has the time? Paper and electronic systems for recording events are less prevalent in small firms.

In seeking to understand how knowledge is formed it is pertinent to consider where knowledge artifacts fit. What tools are considered significant? Management involves more than the people it also involves the tools to do the specific tasks (Spender, 2000).



How are these tools construed in the context of knowledge? In the development of workplace knowledge where should practitioners concentrate – on people or artifacts? Similarly knowledge involves more than people it involves the artifacts used within a cultural boundary, within a community, which carry a portion of that practice's heritage (Lave and Wenger, 1991).

Many employees' experiences of knowledge in a representative form are those that are frequently derived from a heavy legacy of 'book knowledge' (Burgoyne, 1995, p.64). A disadvantage of pre-created knowledge is its loss of value and relevance over time and it's inappropriateness in differing contexts (Bhatt, 2000). In Japan there is a custom of workers publishing books in relation to their work experience that have become recognised as a means of transferring tacit experience into explicit representation and also instil a strong corporate culture (Nonaka and Takeuchi, 1995). Shrivastava (1983) condemns the emphasis on objectifying the knowledge of employees into an organisational learning system. In order to objectify it is necessary to apply methods of reductionism and categorisation. This application of uniformity is averse to the capturing of diversity (Rowley, 2000).

In a large multinational organisation Badaracco (1991) has examined a number of alliances and concluded that despite the technology in-use at the time, the existing knowledge was often defensible by craftsmanship and related to competence and capability:

But even at the end of the twentieth century, in an auto industry increasingly pervaded by highly technical engineering skills and computerized design techniques, much of what a chief engineer knows is not written down.

(Badaracco, 199, p.85)

In 1986 Massachusetts Institute of Technology (MIT) concluded that plant tours, videotapes and manuals that General Motors had relied upon had conveyed only a very partial understanding of New United Motor Manufacturing Inc (NUMMI) procedures. (NUMMI is a joint venture between General Motors Corporation and Toyota Motor Corporation). Knowledge also resides in the routines, company culture and long established working relationships. GM could not buy a manual of the Toyota Production System and expect to gain all the embedded knowledge. The embedded knowledge is far more difficult to pass along than migratory knowledge (Dyer and Nobeoka, 2000).

Chrysler also attempted to produce a knowledge artifact to capture the knowledge content in the organisation. However, measuring the value of this knowledge representation has not been fully explored or undergone any longitudinal study to see if the Book of Knowledge remains a useful management tool (Davenport and Prusak, 1998). If we were to ask Chrysler employees now how they know what they know how many would include the Chrysler Book of Knowledge and where would it fit in their construing?

We are an evolving society using existing knowledge to design symbols and explicit knowledge representations (artifacts) that assist in the creation, diffusion and sharing of

knowledge (Shariq, 1998). We use knowledge to create the very things that are designed to assist in further knowledge. The development of the artifacts is a human process (Shariq, 1998). Garud and Rappa (1994) have found that artifacts used in a community bear the mark of the communities' belief systems and are not founded on objectified knowledge. Thus artifacts built upon a belief system are created which then affect the routines used to warrant how well expectations have been met by the same artifacts. Communities look for what they believe to be the case using artifacts designed to warrant what they believe in the first instance (Weick, 1979, Kelly, 1955).

The technological artifacts become part of a community and individuals increasingly depend on them in order to perform (Shariq, 1998). The tools act as mediators between the subject of the activity and the purpose of the activity. Much work has been carried out by researchers in the field of artificial intelligence, cognitive science and computer interaction in the use of tools to improve performance (Scribner, 1991). Shariq (1998) has taken an original position in questioning the sense making of artifacts and their role in knowledge management. The emphasis is on the artifacts as part of a contextual community and not as autonomous items. This inspired the bisection of the research into an examination of epistemology of knowledge involving employees and the items that represent knowledge in their environment. Methods of informing employees have changed and it is pertinent to examine how employees discriminate between the various representations of knowledge. This study aims to further explore the range of artifacts considered by participants to be linked with knowledge in the workplace and their meaning. The researcher placed the knowledge artifacts (tools) within the contextual



community of usage and asked: What do various representations mean in the context of their grounds for knowledge?

### ***Summary***

The abstract notion of knowledge still brings to mind items that are seen to represent knowledge, for example, books, training materials, technical manuals and company handbooks. In recent years knowledge has become associated with the presence of computing systems. Small firms do not benefit from the variety of representations available in larger organisations. In this investigation of warranting mechanisms it was relevant to firstly uncover the range of artifacts associated with knowledge in a small firm and secondly to expose their relevance.

### **Knowledge and Management**

This study has not set out to devise a frame or model for a specific approach to organisational knowledge. It has set out to expose the sorts of grounds for knowledge in use across diverse communities in a small firm. It is argued that all management disciplines may gain from appreciating the multifarious knowledge warranting mechanisms used by employees. A critical part of what a firm does is to organize knowledge (Brown and Duguid, 1998). This is and always has been management's responsibility. This study proposes management heed existing grounds for knowledge before adopting a specific knowledge management programme. The entire concept of managing knowledge or any management intervention is called into question due to natural knowledge-creating processes of both individuals and collectives (Spender,

1996). Knowledge management as a discipline presumes the reification of knowledge, that is, it has a certain 'thing ness' that has the capacity for management (Wenger, 1999).

Knowledge management has been accused of being no more than another way of managing people or managing information (Alvesson and Kärreman, 2001). Hansen et al (1999) have seen a split between the codification approach to managing knowledge and the personalization alternative. They have suggested that the approach is indicative of the cultural context of the organization. For example, attempting a personalisation of knowledge in a firm embedded in technology or vice versa would be harmful. Good management are conscious of the knowledge based view of their organizations and proactively impress a knowledge paradigm – we just want them to do it more reflectively (Tsoukas and Vladimirou, 2001, Brown and Duguid, 1998). This study wants to promote the idea of management reflecting on where their knowledge and that of their employees has come from.

Knowledge management as a concept appears to contradict itself as in one guise it promotes free flowing knowledge that spills over across communities and networks and on the other hand introduces authority, control and rigidity (Almeida and Kogut, 1999). In one vein knowledge management seeks contribution from all employees as knowledge workers and in another sees specific employees acting as judgemental auditors over knowledge input (Brown and Duguid, 2000). The ideal knowledge management process is socially governed by the contributors and is thus a social entity rather than a management responsibility (Brown and Duguid, 2000). Natural or artificial

the knowledge question requires a greater understanding at an individual and at an organisational level.

This study is not dismissing *knowledge management* as a passing trend. The onset of any new management technique attracts the cynicism and dismissal of its acclaimed benefits as ‘faddish’ or replication and the counter argument (Scarbrough and Swan, 2001, Alvesson and Karreman, 2001). It is ‘something more substantial than a change of fashion’ (Brown and Duguid, 2000, p.74) and is a useful concept in emphasising that people and knowledge are key determinants in organisational competitiveness (Moingeon and Edmondson, 1996). This is often connected to the additional demands placed on individuals to adopt or change their existing work patterns and existing knowledge.

Published works in the new domain of knowledge management are inundated with quick fix and ‘how to’ guides when what is still needed is an unpacking of the concept (Spender, 1996b). The whole notion of knowledge is extremely complex and challenging therefore the meaningful knowledge management literature does not resemble the texts of the more popular subjects in management. At times, writing in this domain refers to philosophical issues and questions of ‘how do we know what we think we know’. Unfortunately, the profile of the management texts market will not necessarily relish this demanding thinking process and therefore knowledge management writers have been forced to temper the epistemological content in order to ensure publication. With greater epistemological content the publications would be categorised as works of philosophy and fail to reach the intended market.



Knowledge management literature has covered eight main processes. First and foremost, generating new knowledge; transferring knowledge; accessing knowledge from external sources; representing knowledge in documents, databases; embedding knowledge in processes and products/services; using knowledge to inform decision making; facilitating a knowledge culture and finally measuring the value of knowledge assets. Following a familiar path of any nascent management technique it is management in large firms who have been the target audience and subjects of research but managing knowledge is seen to benefit companies of almost any size (Hansen and von Oetinger, 2001)

The knowledge management literature is particularly focused upon Nonaka and Takeuchi (1995) Boisot (1998) and Davenport and Prusak (1998). They have pioneered the work on the issue of knowledge in the workplace and developed various concepts and frames. Concepts being the 'basic building block that captures the essence of the thing' (Denscombe, 1998, p.239) and frames that attempt to place some sort of order on their ideas. Their pioneering knowledge management studies concentrate on employees existing knowledge content or means of building upon the content without questioning how content is founded.

Knowledge management writers have adopted Polanyi (1962) and build upon the findings (Nonaka and Takeuchi, 1995). Knowledge is defined as principally tacit; hard to communicate, intuitive and deeply ingrained in the action of individuals, '*elusive*' (Davenport and Prusak, 1998, p.ix) and secondarily explicit; representations of knowledge. Knowledge management, an 'exchanging of insights' (Davenport and

Prusak, 1998, p.ix), attracts the objectivist approach, with the aim of enhancing our ability to capture knowledge as if it were an entirely explicit product. This is reminiscent of a scientific approach to organisations as held by Taylor (1911) who saw the role of management as the gathering of all available knowledge and principles of normative control (Alvesson and Kärreman, 2001, Thompson et al., 2001). Knowledge is thus considered rational and universal another commodity that can be traded and managed. Yet, Davenport and Prusak (1998, p.53) emphasise, 'knowledge is as much an act or process as an artefact or thing.'

Theories aimed at managing knowledge in organisations are typically Western and control orientated. It offers advice for large firms attempting to successfully generate, codify and abstract knowledge. The concepts that are developed are based on the writer's prior knowledge of management practices and changes that would complement existing management styles. This is a pragmatic approach to knowledge but lacks the critical questioning of our habitual and traditional philosophical views. It encourages the move from data to information to knowledge. The management of this process is enabled via Information Technology, the creation of knowledge places in the firm, the creation of specific times to trade in knowledge and training individuals to recognise knowledge. This practice is referred to as knowledge in action (Davenport and Prusak, 1998).

Davenport and Prusak (1998) are optimistic in their claim that knowledge in action enables more than an exchange of information but also the opportunity to exchange ideas, beliefs, intuition and experience. The researcher is sceptical about the lack of



supporting research that substantiates the knowledge in action practice as making any significant difference to the nature of knowledge in an organization. It is based on the presumption that employees are inert until pricked into action by some motive or stimuli. This form of knowledge market is disabled by existing social norms. It is often a sign of weakness or incompetence to admit to a shortfall in knowledge therefore the social cost of buying knowledge is too great. In addition, calculating and secretive hoarders of knowledge still thrive. There is no currency valuable enough to tempt them to share their expertise (Davenport and Prusak, 1998).

Davenport and Prusak outline concepts that help to generate, codify and abstract knowledge. They list the key components in knowledge as experience, ground truth, complexity, judgment, rules of thumb, intuition, values and beliefs. They expand on the idea of ground truth by using anecdotal evidence from the US army. Implying there is a difference between the theory of tactical attack and the real life experience. Davenport and Prusak emphasise the relevance of this ground truth knowledge. They did not provide any detail of individual responses to this ground truth knowledge to examine if all individuals are as accepting as each other in terms of descriptions of real-life stories.

It is clear that knowledge is highly complex and yet Davenport and Prusak presume the reaction to the knowledge repositories will be identical. The Western Hemisphere remains deluded by the position of the exact sciences and therefore knowledge in action is unlikely to dwell on beliefs with the same enthusiasm for truths. The philosophy of the stakeholders in the organisation will create a bias as to what knowledge will be stored or transferred, in the organisation. The management in a firm cannot be



differentiated in that we all use established knowledge to determine what is seen and use what is already known to choose what to look for in our environment (von Krogh and Roos, 1996).

Knowledge capabilities in Japanese organisations are seen to differ from the Western Hemisphere. The prime difference in the view of knowledge is the Japanese acceptance and utility of thick tacit knowledge alongside that of fluid explicit knowledge. Tacit knowledge is deemed to dictate the representation of the explicit knowledge. In addition the transfer of knowledge in Japanese firms is aided by management's adoption of a middle-up-down management style and not the more typical Western style top-down.

The most notable concepts and frames in knowledge management literature were without exception all derived from work conducted with large firms; BP, Canon, Coca-Cola, Courtaulds, GE, Matsushita, Microsoft and NEC are just some examples of the many blue-chip companies participating in research. Building on this initial work other researchers have added new dimensions to the debate but remained in the large firm domain.

It is clear that knowledge management is called many different things and involves a range of initiatives (Clarke and Rollo, 2001, Storey and Barnett, 1999). The education element is emphasised by Huseman and Goodman (1998) with a proposed introduction of the corporate 'kanbrain'. The term derived (corrupted) from the Japanese kanban just in time stock control system. They have interpreted the creation of new knowledge as being influenced by the availability of education opportunities. Education needs to be

on-demand, on-site and incorporated into everyday working life (Huseman and Goodman, 1998). This approach links with organisational learning and is more concerned with the creation of new knowledge rather than movement of existing knowledge. However, a pertinent and frequently stressed point made by Huseman and Goodman is the concept of value and competitive advantage.

Employees are seen to hold onto their knowledge due to misplaced views of the competitive advantage of their knowledge. Management in firms have traditionally aimed to protect the knowledge embedded in the products and processes. Likewise individual employees, fearful of redundancy, see the competitive advantage in the hoarding of their knowledge as against sharing and expansion. Therefore, a firm's management wishing to seek competitive advantage from the collective knowledge must first encourage individuals to see the competitive advantage of sharing knowledge. This raises the complication of overcoming value perceptions and developing a need within the individual. The discussions surrounding knowledge management are too often biased towards the organisational level, rather than to the group or more importantly, the individual and communities (von Krogh and Roos, 1996).

The management of knowledge portrayed by Huseman and Goodman (1998) creates a vision of control and authority. They commend the work of an American Consultancy firm employing 3,500 people that has appointed a Chief Knowledge Officer (CKO). The CKO orchestrated an on-line intranet based application that was seen to incorporate the knowledge of the organisation but really amounts to; employee CVs, training materials

and a searchable message application. It does not seem to respond to the individual's tacit knowledge, values and beliefs.

IBM approach knowledge management based on a view of tacit to tacit knowledge transfer (apprentice schemes, mentoring and workshops) using soft processes as a precursor to the installation of intellectual capital management programmes (Snowden, 1998a). Thus it is seen to support a naturalistic community of knowledge transfer and not an enforced system devised by an external consultancy. Direct command of knowledge transfer, in a large firm has been shown to be ineffective (Storey and Barnett, 1999). However, a soft process does not equate to a low prioritisation as large firm knowledge management requires grounding in a firm's strategy (Zack, 1999).

The over-riding importance of value and bias in the knowledge debate is best demonstrated by the intellectual capital supplements to the accounts of Skandia, the Swedish insurance company. Devised using the IT application 'Skandia Navigator' the supplement is deemed to place a monetary value on the human and structural capital of the firm. The human tacit element is represented by stories and illustrations in addition to the figures to represent the sum of knowledge in Skandia (Mouritsen et al, 2001). Knowledge is a constantly changing and evolving notion and yet the accountancy profession is pressing for its accountability. Once again knowledge in large firms is misconstrued as a marketable commodity or asset.

The management of knowledge in the business context has incorporated ideas from organisational learning. The transfer of knowledge is complemented by the adoption of a



strategic learning approach but this does not incorporate all of the relevant knowledge issues. The models and frameworks that are driving forward the creation of a knowledge management theory encompass a shift in emphasis from the scientific to a greater focus on the social nature of knowledge. However, in their interpretation, too often, large firms have remained focused on the authoritarian control feature of management and the expansion in knowledge artifacts.

The management aspect of knowledge is fundamental to any size of firm's business strategy (Vos et al, 1998) yet Beijerse (2000) found that no explicit attempts at knowledge management existed at all at the strategic level in his small firm studies. This is not to claim that small firm are disadvantaged by their lack of response to the calls for processes to manage knowledge. By first examining the grounds for knowledge in their organisations small firm management may develop a more appropriate response to this call to develop a knowledge based view of the firm (Spender, 2000).

### *Summary*

This thesis is not aiming to devise a process for managing knowledge in a small firm but it does recognise a trend in management to interfere with what is a natural occurring phenomenon. By considering the knowledge issue in a workplace setting this study has something to offer those who are seeking a designated responsibility for knowledge. It offers an opportunity to reconsider the grounds for knowledge held within a bounded context of the workplace as a precursor to management involvement.

## **Learning in Organizations**

Knowledge and learning in organizations are indisputably linked but not synonymous. Learning is a process that results in a state of knowing of, knowing about, knowing that, knowing how. When thinking about how you know what you know it is clear that this is not the same as thinking about how you learn what you learn. Knowledge potentially involves a learning activity. There is also distinction between understanding knowledge in organisations and understanding learning in organizations. The latter concentrates on dynamic processes of learning and the former has focused on evaluating static knowledge accumulated through learning (Dixon, 1999). It is right that theorists have begun to try and analyze, the knowledge, 'which is the result of the learning process' (Spender, 1996b, p.56).

Understanding the episteme of knowledge states remains critical and will inform learning experiences at individual, group or organisational level. There remains a need to take time to reflect on the meaning of not only what is known but also how that something is known. The 'how' can be misconstrued as a pure learning activity when it actually involves individual and socially agreed warranting mechanisms. An examination of warranting mechanisms held by a community may complement advances in organisational learning.

The concept of organisational learning shares a certain schema with knowledge. They both have a contextual element (Findlay et al, 2000). They are both considered from an individual, a social or a combinational view (McDougall and Beattie, 1998). They have both suffered from an excessive focus on particular work groups (Findlay et al, 2000)

and endured certain scepticism (Holden et al, 2003). Similar to personal knowledge being the primary object in knowledge models (Boisot, 1998) theoretical models have surmised that individual learning is the first stage in organisational learning (Mumford, 1997). Interest in both knowledge and learning provide evidence of employer's recognising the valuable development of human resources.

Attention to the learning issue in the workplace arose chronologically prior to the interest surrounding knowledge in organisations. This is not to say knowledge issues have replaced organisational learning, as the two approaches should complement one another. A linear hierarchy is denoted by Dixon (1999, 2000), that is, the purpose of knowledge management being the management of the results of learning and this contrasts with an iterative cycle conveyed by Lavallin (2001). Reflecting on what is known pre-empts the learning process and the learning reconstrues what is known (Wenger, 1999). Learning transforms who we are and what we can do providing a revised sense of identity that makes each of us a certain person (Wenger, 1999).

Occasionally writers concerned with learning have supported the work that has and is taking place in the field of knowledge in organisations (Denton, 1998). Whilst other writers involved in learning issues have dismissed knowledge as a manageable commodity (Currie and Kerrin, 2003). Agreeably the management of something can be considered an intervention so managing knowledge may not take into account how an employee's knowledge has been created (Currie and Kerrin, 2003). A compromise is offered by Bhatt (2000) who sees a framework combining information dynamics, learning and knowledge.



Denton (1998) studied organisational learning practise with five major manufacturing organisations in the UK including Mayflower Corporation plc, a major customer of the case study small firm used later in this research. The automotive sector indicates a support for issues relating to learning and knowledge. Denton examines the five companies' attitude to organisational learning based on nine individual characteristics. One of the characteristics is 'knowledge creation and transfer' (p.95) but the definition is reduced to a description of technology use and database compilation, that is, knowledge as data processing.

Knowledge is acclaimed as a source of competitive advantage and it is proposed that firms adopting an organisational learning approach improve their opportunities to create new knowledge, transfer knowledge and compete (Denton, 1998). Yet the interpretation of knowledge by those interested in organisational learning is directly linked to an information commodity and therefore fails once again to really grasp the notion of knowledge. Denton is applying knowledge terminology to what is in effect information transfer that assists in creating new knowledge.

Learning involves sharing existing knowledge, beliefs or assumptions at an organisational, community and individual level (Shrivastava, 1983). Learning is not limited to positivist facts; it can also include beliefs and personal assumptions (Nonaka and Takeuchi, 1995, Sparrow, 1998). Rowley (2000) characterises knowledge as being 'multi-faceted' and encourages a move beyond objective fact and truth. Society has created norms for learning and in the Western Hemisphere we need to reconsider the effect of these norms (Wenger, 1999).

Something extra is added by drawing upon the individual knowledge that results in more knowledge for the firm. Learning at work is a collective process (Tenkasi et al, 1998). Burgoyne (1995) concentrates on the notion of learning from experience but it is stressed that this experience refers to a collective creation of meaning and not individual meaning.

Organisational learning literature based on small firms has raised some interesting points relevant to the issue of knowledge in small firms. Learning in the small firm is often incidental involving social and domestic issues as well as the need for organised self-development (Choueke and Armstrong, 1998). The lack of resources or formalised learning structure has led individuals, employed in many small firms utilising sources outside the firm to improve their learning and add to their knowledge. Resources and capabilities of firms within a network influence the learning capabilities arising from alliances (Gulati, 1999).

The attempts at formal learning taking place in the small firm often take the tacit –tacit form, with the trainee learning from watching the more experienced employee (popularly referred to as ‘stand by Nellie’). Here, it is presumed that by watching a fellow employee for a short time a trainee can then complete the task to the same standard. This pattern was frequently witnessed by ethnographer Holliday (1995) and criticised for its unrealistic expectations. The newly ‘trained’ employee is expected to perform at a similar skill level and at a similar piece rate as the experienced worker. The process also denies the newcomer a platform to air their existing knowledge.

Small firms have shown a reluctance to adopt organisational or individual learning theory which is related to a lack of evidence to categorically reveal a direct positive effect (Holden et al, 2003, Chaston et al, 1999). There is a relationship between learning and capability but this did not enhance performance (Chaston et al, 1999). Parallels can be drawn between these findings and the weakness with the knowledge proposal.

Organisational learning literature proposes that learning is beneficial for the prosperity of the firm. Learning is a process that assists the individual in altering their knowledge; this does not guarantee an expansion or utility of the knowledge acquired. Holden (2003) found inequalities and structural problems with a small firm employee led development programme. Learning appeared to be construed as short term work –related *competencies* and an impoverished attitude towards broader learning issues. The learning literature is weakened by the focus on imitation and replication of knowledge rather than the development of new knowledge (von Krogh and Roos, 1996). Organisation learning literature is further weakened by a frequent presumption that learning can be continuous. Yet, research indicates certain employees, for example older workers and particularly female older workers may start out by attempting to learn all that they can about their organisations environment but over time form set opinions as to what they need to know and this limits their search (Findlay et al, 2000, Miller and Rice, 1967).

### ***Summary***

Knowledge and learning is not the same thing even if they have been approached using similar variables and frames. An interest by business researchers in knowledge issues



should not over-ride the work that has and continues to take place concerning learning in organisations. Organisational learning has shed light on developing human resources and plays a role in knowledge issues. Further work is considered useful in understanding the impact of learning activity in the workplace on the knowledge state.

This section included a review of learning pertaining to resource constrained small firms. Learning in this context is often ad hoc and reliant on existing employees with a particular skill who are not experienced trainers or external agencies. Small firms support for learning theory is affected by a lack of positive evidential support. Additionally, employees are not continuously learning and can choose to stay as they are with the learning alternative not pursued.

### *Summary of the Literature*

Literature that encompasses the notion of knowledge is vast and crosses many disciplines. This review aimed to incorporate existing work from a range of subject sources. In the opening section definitions of knowledge were explored. It was found that definitions varied from a simple idea of everything someone claims to know should be regarded as knowledge to knowledge being a derivative of information. A useful three dimensional representation of knowledge incorporates different kinds of mental material, forms of thought and types of thinking (Sparrow, 1998). However, for the purposes of this study knowledge was not rigidly bound by a specific definition but seen as an active state of being once thought to be value-free but now commercially understood to offer competitive advantage. There have been some attempts: Tsoukas and Vladimirou (2001), Sparrow (1998) and earlier von Krogh and Roos (1996) at researching the question of perceptions and constructs of knowledge linked to contemporary philosophical theory conveyed by Hamlyn (1970).

From defining knowledge the literature then examined angles of knowledge epistemology beginning with the expert historical antecedents. Further expertise was sought from the academic community who regularly and rigorously debate the topic of epistemology. Work has commenced by some who have already noted epistemological differences in academia (Tsoukas, 1994) and epistemological differences in work (Garrick and Rhodes, 2000). The section on epistemology closes by reviewing the most recent attempts by management researchers to understand how we know what we know in a work related context (Alvesson and Kärreman, 2001, Cook and Brown, 1999). In

respect of context it was clear that large firms dominate research activity with only a few spotlighting on small firms (McAdam and Reid, 2001, Sparrow, 1999). It is puzzling as to why knowledge in small firms has not received particular attention given the value of small firms to the UK economy. Is it considered irrelevant in that small firm management are already experts of knowledge or irrelevant in that due to size there is no value to the small firm in adopting a knowledge paradigm? It is clear there is a void in the literature in relation to knowledge and small firms. There is a need to understand the various episteme of knowledge that has meaning for employees within a small business context.

With a proviso that knowledge should not be viewed isolated from context the literature encompasses a detailed examination of the small firm scenario. This reveals the constraining forces that small firms endure in their struggle to survive and grow (Ram, 1999, Ram et al, 1997, Ram 1994). Small firms and owner management are set apart from entrepreneurs and entrepreneurial enterprise to ensure this study is correctly directed externally.

Knowledge is indiscriminate and yet current business research has focused on elite groups. This is particularly prevalent in small firm research where the owner manager is prime focus of attention. An examination of knowledge epistemology should consider the input from all functions within an organisation to gain a deeper holistic study as also called for in organisational learning (Findlay et al, 2000). Knowledge is derived across a social network of individuals functioning together in the workplace. It is essential we gain a better understanding of the meaning of knowledge in relation to people across the



spectrum, including the little people (Boje, 2001). This holistic perspective arose as a reaction against the mindset of dominant personal knowledge as a form of objective possession. Personal knowledge is seen to exist in tandem with socially construed knowledge. Therefore, literature assigned to the domain of communities of practice was valuable in understanding how a community may operate and as an additional element to knowing in the workplace.

Knowledge may become represented by artifacts devised internally or external the workplace. Engestrom (1991) summarises the logic of including artifacts in this study of knowledge epistemology claiming that such representations are part of a holistic approach. Small firms face complex issues in keeping pace with the development of artifacts and still rely on people storing what they know in their heads (Holliday, 1995, Scase and Goffee, 1987). Management also need to consider not only the effective management of people but also the artifact resources. This management responsibility has now been extended to include the tricky notion of knowledge (Wenger, 1999)

The debate in business surrounding knowledge and management could not be ignored in this review of knowledge in organisations. A practice that appears to concentrate on questions of knowledge ownership, control and financial value alternatively knowledge transfer and creation of new knowledge derived from an emphasis on networking and learning (Nonaka and Takeuchi, 1995; Boisot, 1998, Sparrow, 1998, Scarbrough and Swan, 1999). Learning is so entwined with knowledge that a final section draws attention to works relevant to the frame of this study, emphasising support for learning as a process rather than learning as synonymous with knowledge. How an employee

knows what they know will not be totally assigned to learning it is an epistemological issue of warranting what is known.

Learning is considered in the context of the small firm (Chaston et al, 1999) where much of what is known is still not written down. Learning is also viewed as a social process rather than purely individual (Shrivastava, 1983) but often misunderstood as an explicit transferable commodity (Denton, 1998).

The literature review concludes by summarising the research question and explaining the scope for this study.

## **The Research Question**

The aim of this study is to question on what basis knowledge is formed in today's commercial world. It is addressing participants' *work related knowledge* appreciating that there are many types of knowledge (Sparrow, 1998). On what basis is knowledge formed in the specific context of a small manufacturing firm? This research asks how employees and management know what they know and how can they be sure of their knowledge and the knowledge of others.

Recognising that knowledge is strongly associated with certain individuals this thesis questions how participants perceive the warranting mechanism of a knowledge icon.

Knowledge is viewed as personal in tandem with a social construction. Consequently this thesis provides an insight into the communities of shared knowledge construing within the confines of existing hierarchical structures then opened to a holistic bounded context of the complete small firm.

Finally, pertaining to this holistic study it was essential to ask what role artifacts played in providing warranties for employees and management.

### **Scope of this study**

In-depth inclusive studies of small UK firms are rare. The scope to make statistical generalization with such work is precluded. Findings from a knowledge enquiry with twenty participants from one firm cannot be upheld as relevant to all UK small firms. Therefore, the value of such particular detail is frequently questioned. However, it is held that newly discovered propositions arising from this investigation will add meaning to a theoretical development of grounds for work related knowledge, particularly affecting small firms.

Companies may benefit from an examination of individual and social mechanisms for knowledge. Transferring knowledge is improved by a greater empathy for one another's perception. Identifying constructs elicited in the context of grounds for knowledge derived internally, externally and from a knowledge icon will improve access to alternative ways of knowing. Decision making alert to knowledge frames used by others will add complexity but produce results. Above all the scope of this research is to



spotlight diversity even within one small firm to encourage management to investigate their knowledge culture by initially addressing the unique knowledge perspective held by their employees.

However, unfortunately, placing a financial measurable value on knowledge as a result of this investigation is beyond this research.

This study does not set out to denigrate tools that may improve warranting mechanisms utilised by employees and management. Instead we may gain insight into the priority given to artifacts by individuals and communities in their construction of knowledge. An appreciation of the individual and social meaning in the context of knowledge represented in documents, databases, and so on will improve design and expectations of engagement with such artifacts.

Understanding knowledge epistemology in the small firm workplace precedes any attempts at management. The term management implies a control or intervention in an activity. If we are to manage something, managers need to appreciate what they are attempting to manage. As knowledge is personal and social, management need to explore the varied warranting mechanisms within their communities before embarking on any system to manage the knowledge held by employees. The question of how do you know what you know is an uncomfortable thought provoking and commercially alien territory. It is the question that has been disturbing philosophers for thousands of years.

## CHAPTER THREE

### METHODOLOGY

#### Introduction

This chapter covers two main components: how the research was conducted and justification for the procedure. The first component begins with a complete overview of the method followed by a description of the pilot study and the repertory grid process. Next, a detailed explanation of how the case company was selected and a background to the firm and participants employed in the study. A research analysis section outlines the tools and approach taken in evaluating all collected data.

The second component of this chapter includes a conceptual framework that led to the choice of method which is further supported by rational and implications of data collection. The justification of knowledge claims concludes this second component. A final summary provides a précis of the Research Methodology. A third component of any research method is the recognition of any limitations or weaknesses found during and following the study. Chapter five includes a section reflecting on the drawbacks encountered due to the choice and use of method.

## Overview of Method

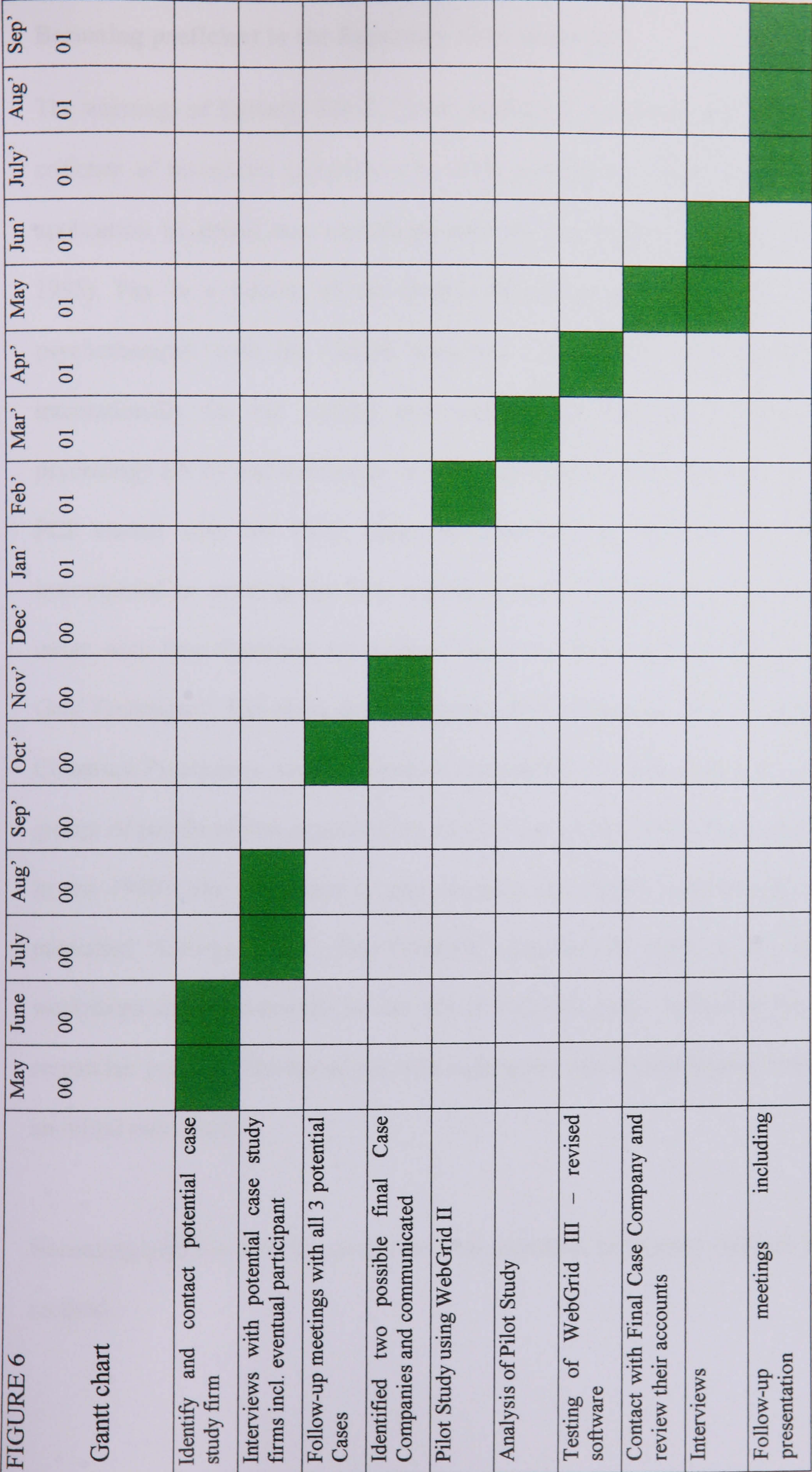
The method involved two stages. Initially, a pilot study was conducted to assess utility and success of the planned research tools. The second stage consisted of an intricate and subtle examination of a mixed group of twenty employees and management employed by one small manufacturing company using repertory grid technique (RGT) (Kelly, 1955, Easterby-Smith et al, 1996 and Jankowicz, 2001) and additional face to face interviews with management. Twenty participants representing various functions throughout the firm completed two repertory grids questioning the basis of how they know what they know. One set of ten elements included role titles, for example, colleague and key informant. A second set of elements was firstly elicited by the prompt *'things you use to help you to know what you know'*. This led to a list of usually six or seven artifacts. The results from all of the repertory grid conversations were analysed using a form of content analysis (Jankowicz, 1987); Web Grid II and III software (<http://tiger.cpsc.ucalgary.ca/Web Grid>), individual cameo's (Boje, 2001) and the social construction provided using sociogrid (Shaw, 1980).

A Gantt chart (See Figure 6) provides a useful chronological reference to this study.



FIGURE 6

Gantt chart





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## Becoming proficient in the Repertory Grid Interview

The warnings of Easterby-Smith (1996) in relation to the complexities of RGT and the criticism of researcher capabilities by Gibb and Davies (1991) led to the researcher's application to attend two workshops lead by Fay Fransella (1977, 1978, 1988, and 1995). Fay is a Fellow of the British Psychological Society and registered as a psychotherapist with the United Kingdom Council for Psychotherapy and known internationally for her writing and teaching on the topic of personal construct psychology (PCP) and the design and use of repertory grids. Fay Fransella's work with PCP started with her Ph.D. thesis on stuttering in 1965. In the 1970's she was instrumental in creating the now regular biennial International Congress in PCP and wrote with Don Bannister the books "*Inquiring Man*" and "*A Manual for Repertory Grid Technique*". Her main developmental work as Director of the Centre for Personal Construct Psychology was the creation of a method for using repertory grids with large groups of people within organisations and the use of PCP within organisations generally. In the 1990's she continued to give lectures and papers internationally and in 1995 published "*George Kelly*". Fay Fransella continues to work in the field organising workshops and short courses on the use of repertory grids. Following the workshop the researcher practised the technique with colleagues, family and friends before conducting an initial pilot study.

Becoming proficient in the technique was essential to support internal validity of the method.

## The Pilot Study

The pilot study took place over a one week period in February 2001. The pilot case identified using the researcher's personal network built-up during her motor-industry-associated career. The automotive service firm facilitates the volume leasing of vehicles in the car rental industry. It had been trading since 1997 and employed six staff. It recorded a turnover of £360,000 in 1999/2000 growing over the research period to employ fourteen staff and a turnover of £1 million (2002/2003) and a net profit before tax of £80,000 in 1999/2000 and £400,000 in 2002/2003.

The pilot case was relevant to the context of the study for a number of reasons. The company would fit into the EC definition of small firm and had no formalised knowledge strategy in place. The company was not a small version of a large business; instead it experienced enabling and constraining factors that are familiar to small owner-managed UK companies. As a small firm it faced the difficulty of creating and managing knowledge from a marginal labour market (Carson, 1991). The budget to invest in employees was extremely limited and career opportunities in this firm were restricted.

The pilot case, as typical of many UK small firms, had become dependant on a limited number of powerful customers who dictated the workload and determined time pressures. The pilot case operated in response to the needs of the major motor manufacturers.



A further relevant consideration was background of the employees. The owner manager began his career as an apprentice on the shop floor of a UK motor manufacturer and all other staff also had few or no formal qualifications. It was anticipated that the final case for the research would also identify participants with minimal formal academic qualifications. The owner manager was agreeable to all staff being included in the pilot study and the intention was also to involve a majority of the employees in the prime case study.

The participants were individually invited to interviews. The first few minutes were spent on introductions, aiming to assure the participant of confidentiality and the purpose of the research. The researcher wanted to overcome any misconceptions that the participants may have had. The participants may have wrongly presumed that this person from a university knows all the right answers and this was a form of peculiar test situation. Following this, the participant was asked if they still wished to proceed.

The first grid was aimed at the identification of constructs in the context of how elements were construed to know what they know. The second grid aimed to elicit constructs linked to representations of knowledge. The constructions are the discriminations that individuals utilise to anticipate the outcome of events in the future. They are organised as a linked system of bi-polar constructs with the core constructs being central to the person's sense of self. There is never a 'right' view of things or an objective unquestionable truth residing in a construct because there are always alternatives, some of which may not even exist at this present moment. Fransella and Bannister (1977) recommend that a construct should be considered as a discrimination

and not a verbal label. The researcher and participant are able to identify these discriminations or templates during the repertory grid process. Unfortunately, confusion has arisen with this activity and led some to conclude that all constructs can be articulated. Fortunately, our constructs are not fixed discriminations as we seek personal meaning to either refine or extend existing constructs, within a specific range of convenience.

Contrary to the more familiar interview style whereby answers may be supplied with little pause or hesitation, the construct elicitation needs time for thought and inner reflection. Both researcher and participant need to feel comfortable with these pauses and not rush to complete 'answers'. Repertory grids have been designed to provide a degree of structure but it was also essential for participants to feel free to ramble. This leads to a loss of control but the pay-off is the data becomes central to participants. Therefore any rambling should not be viewed as a nuisance but throws light on what is of concern from the participant's perspective.

The researcher explained to each of the participants that the pilot study was a means of examining the feasibility of the research method in a commercial situation. The completion of repertory grids is not a familiar exercise in business research and it was necessary to estimate the timing and effectiveness of the technique prior to administering in a larger group. A manual completion of repertory grids was used with the employees 'eyeballing' the completed grids.

## Repertory Grid Process Applied in this Research

All conversations were carried out in the same location within a few days of each other. At the beginning of each elicitation process a whimsical triad was demonstrated, as recommended by Stewart and Stewart (1981). This released any tension, nerves or anxiety for both the participant and the researcher:

Opening demonstration of the triad technique:

### Element Set One

Car

Donkey

Train

“Name a way in which two are alike and different to the third”

And

### Element Set Two

Ronald Reagan

Margaret Thatcher

Bill Clinton

“Name a way in which two are alike and different to the third”

The researcher anticipated that all participants would be familiar with both the objects and subjects, hastening the process. The participants appreciated that the researcher was not testing for right answers.

Once the participant appeared comfortable and relaxed with the process the main research commenced. The elicitation of constructs was divided into two parts. The first repertory grid was based on ten supplied role-title elements (Part A) and the second grid was based on elicited elements (Part B). (See Figures 7 and 8)



FIGURE 7 FLOW DIAGRAM OF PART A CONSTRUCT ELICITATION

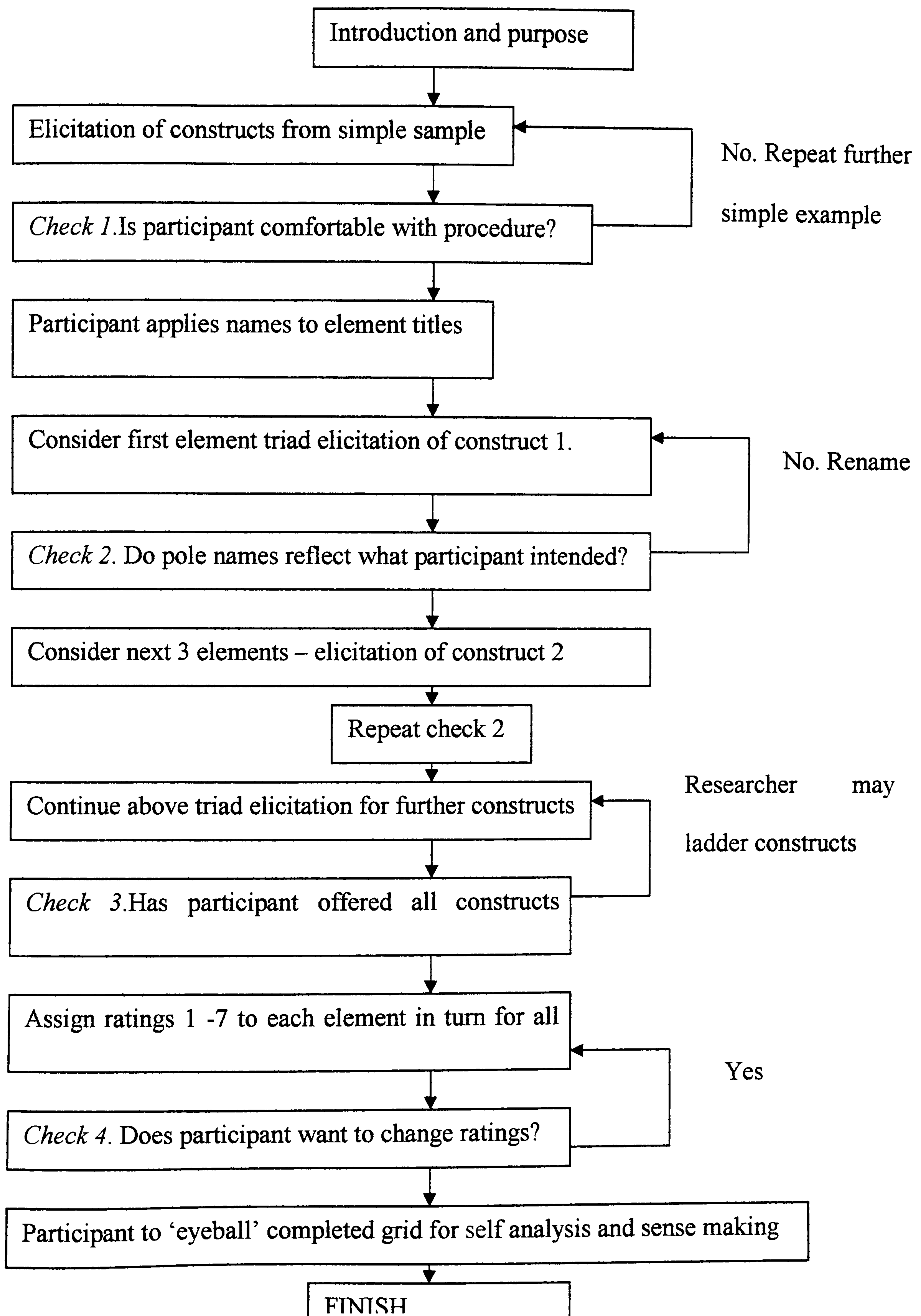
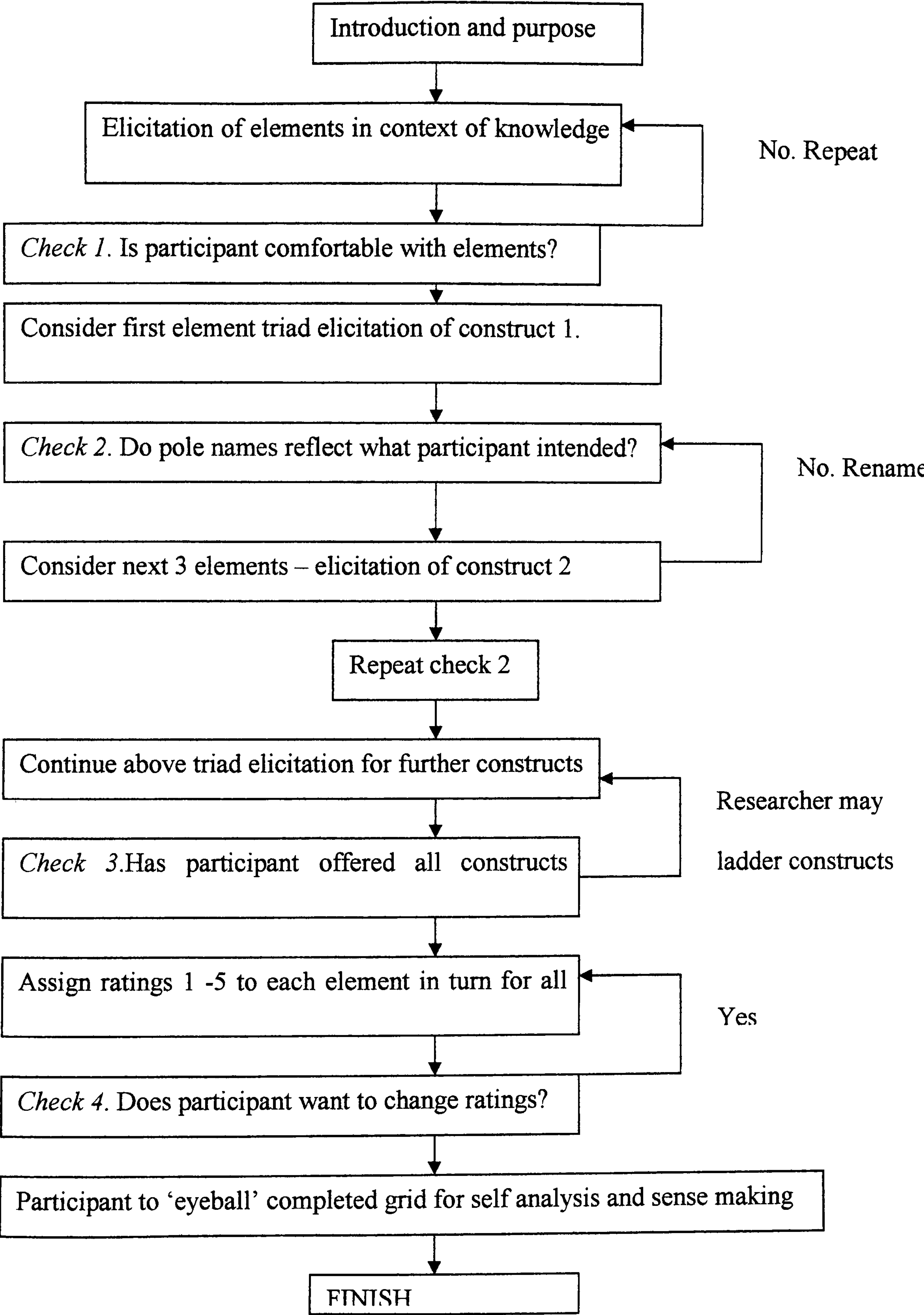


FIGURE 8 . FLOW DIAGRAM OF PART B CONSTRUCT ELICITATION



## Part A.

### *Supplied Element Role Titles*

In the first set the element titles were provided and the participants were asked to identify an individual to each title, which would remain anonymous. The element titles for the first set of constructs were:

- When I say knowledge the first person you think of
- A person who conducted any part of your formal training
- An immediate colleague
- Another employee within the firm
- A key informant external the firm
- Another key informant external the firm
- An individual from your home/social life
- The owner manager
- Me
- Me as I would like to be

The role titles were intended to include what the researcher perceived as prime influences on an individual, of legal working age and currently in work. The reason for the selection of each specific role title is detailed below:

- *When I say knowledge the first person you think of*

This role title could represent anybody at all, from history, society, and personal life. It was the name that to this participant epitomises what is knowledge. In the triad sets it arose on four occasions, that is, the most frequent. The role title therefore occurred throughout the elicitation process as a reminder of the theme of the context.

- *A person who conducted any part of your formal training*

The knowledge management literature commonly focuses on training of employees as a means of creating new knowledge. The term training was not limited to that taking place with the current employer but related to the participant's post school training.



Realistically the SME employees may receive training intermittently and from a variety of sources but again the need was for the participant to identify a link between an individual and training.

- *An immediate colleague*

Once again it is the knowledge management literature that has prompted the inclusion of a role title. The consensus being that knowledge is to be found within employee's immediate vicinity. Insufficient has been written on the effect, on any knowledge process of the social relationship between colleagues. The research exposes whether colleagues were able to construe knowledge of colleagues as distinct from their personal opinions of the colleague's character/personality.

- *Another employee within the firm*

This provides an emphasis of the above.

- *A key informant external the firm*

The positive value of external networking has arisen in the literature. Due to size constraints small firms need to maximise the knowledge accessible through their external relationships. The SME research that has explored networking concentrates on the owner manager or senior staff. This research expands on this position by including all key informants regardless of status. For example, a despatch clerk is asked to consider a delivery driver as a key informant. The researcher appreciated that this commonly used business euphemism key informant may require explanation.

- *Another key informant external the firm*

Emphasis of the above

- *An individual from your home/social life*

The researcher held that constructs arising from the above element knowledge would provide a more in-depth holistic view of the individual rather than containerising constructs of knowledge completely to the workplace.

- *The owner manager*

The pivotal position of the owner manager in an SME was justification for inclusion. The owner manager attitudes, values, motivations and abilities manifest as the key underpinnings of the organisational culture of many small businesses.

- *Me*

This offers an opportunity for the participant to reveal constructs that signify his or her own knowledge. The construct elicitation process is self-reflective and weakened by the exclusion of the self. The participant is considering where they fit on dimensions of knowledge in relation to others.

- *Me as I would like to be*

Personal Construct Theory is a forward-looking anticipatory theory. The grid process exposes constructs that may have been deep rooted and seldom discussed. The *Me* element highlights a current position but the *Me as I would like to be* focuses the participant on the choices that are available based on the complete range of constructs. The participant has the ability to strengthen or further validate existing constructs or consider reconstruing their position.

The elements were written on individual cards and then the triad method involved presenting the participant with a trio of elements. The triads were presented as sets in the

form, 1-2-3, 4-5-6, 7-8-9, 10-1-2, 1-4-7, 2-5-8, 3-6-9, 1-5-9 and 10-8-6. This created the four appearances of element one and the lesser three or two appearances of the other elements. For example, Element 1. (The first person you think of when I say knowledge), Element 9. Me (the participant) and Element 10. Me as I would like to be. The next stage involves the researcher asking a specific question. It is a question that has taken a number of forms since Kelly originally devised the method. Fransella and Bannister (1977) pose the question;

...specify some important way in which two of them are alike and thereby different from the third. (p.14)

Alternatively, Easterby-Smith et al (1996) suggest;

The subject is presented with three cards and asked to consider ways in which two are alike but different or opposite in the third. (p.9)

In Banisters (1994, p.76) view it is preferable to ask for the difference rather than a contrast or opposite as he feels by asking for a difference the person does not feel obliged to provide a 'generally accepted contrast'. An opposite or a contrast infers some connection or link. Without question notions that are opposite will indeed be different but notions that are different need not be opposites. Ravenette (1999) discusses this troublesome issue.

The Web Grid II elicitation software is programmed to request the participant specify some important way in which two of the elements are alike and different from the third. The difference is input and the similarity between the remaining pair is recorded as the contrasting construct. The researcher used the WebGrid II phraseology, as part of the



analysis procedure would also be based on WebGrid II. Please note the main case was analysed using the updated version of WebGrid III.

Further constructs were elicited using the laddering method (Hinkle, 1965) or pyramiding (Landfield, 1971). The laddering method first requires the elicitation of a construct by either the triadic or dyadic process. Then the participant is asked to look at the bi-polar construct and say which pole of the construct they would prefer to be. The question is then posed as to 'why' they wish to be this end of the polar dimension. The next construct given is super ordinate to the first and this process continues until the person is unwilling or unable to climb any higher up the 'ladder' within the individual's organisation of constructs. Constructs are not just a jumbled assortment of perceptions they are organised by the individual, with some constructs closer to the centre, to the essence of the person, than others (Stewart and Stewart, 1981). The alternative to laddering up is to climb down the 'ladder' (pyramiding) by asking the question 'how do you know that a person is X' (using one dimension of a previously supplied) bi-polar construct.

The elicited constructs were added to the repertory grid document. The elements could then be ranked or rated or both in terms of the constructs. In the pilot study the constructs were both ranked and rated. Constructs were rated but not ranked in the main case as ranking was found to have little meaning in the context of this research.

## **Part B.**

The procedure for Part B followed that of Part A with the exception that elements were not supplied. Instead participants were requested to list a minimum of six items they considered were things they used to know what they know in relation to their work.

## **Case Study**

The case was an automotive component precision press enterprise employing a total of thirty- two staff located in Birmingham, UK. It offered a natural setting which was not created for the purposes of the research and was one of a type of labour intensive, low skilled manufacturing firms suffering resource constraints and competitive pressure from overseas markets. The Works Director agreed to contribute and arranged for nineteen other fellow workers in the factory to participate. The twenty case study firm participants are viewed as the unit of analysis. The participants were all voluntary and the only physical recompense for their time was a statement from De Montfort University thanking them for their contribution.

The relationship with the case had commenced with an initial introductory day organised by the Managing Director including a tour of the factory and lengthy conversations with both the Works Director and Managing Director, both describing in detail the production and operation of the firm. A follow-up meeting with the Works Director was organised to familiarise him with the research instrument. A convenient time period was set aside for the lengthy process of completing two repertory grids with each of the 20 total



participants. This activity took place over a three week time period, each participant spending a minimum of one and frequently two hours in the completion of the required grids.

The completed grids were “eyeballed” with the participant to ensure it was the participant who recognised and agreed with the interpretation of the grid. The technology was available on-site via pc laptop and modem to input the data into the WebGrid III software programme enabling various graphical displays. The practicalities and cost, in terms of telephone line, made it undesirable, for the host firm. As an alternative the graphical displays were completed at a later date.

Participants were given the opportunity to think over their comments and address any concerns to the researcher. The researcher, using repertory grid technique successfully avoided the use of interviewing based on question-and-answer method.

A final feedback session with the Works Director provided a means of communicating an initial interpretation of the research and an opportunity for the Works Director to air any concerns. In addition a poster was prepared for display in a common area providing feedback to all participants (Reason and Rowan, 1981).

The completed grids were analysed using WebGrid III, followed by a Content Analysis of the constructs. A selection of participants’ constructs were input into the sociogrid (Shaw, 1980) program to examine the sociality of meaning in the group.

## Case Selection

Initially a letter inviting firms to participate in the research was sent to fifty automotive component manufacturing small firms (See Appendix III.). The sample population was initially identified using data supplied by The Department of Industry Automotive Section fitting within the criteria of small firm and located in the Bedfordshire, Buckinghamshire or Midlands areas in the UK. The Midlands and Central England have a long tradition of association with the motor industry.

Follow-up telephone conversations with all the firms led to four initial interviews. From these interviews two companies indicated their willingness to participate in the full field study and both companies were visited on two occasions. Both firms were situated in the Standard Industrial Classification '343 'Manufacture of Parts and Accessories for motor vehicles and their engines' outlined in Table 1.

The researcher felt that it was essential to build up a rapport with the participant case, as a considerable resource commitment was demanded and a further commitment to the continuity and completion of the study.



*Table 1. SIC '343 Statistics for the United Kingdom 1997 (Source: Department of Trade and Industry)*

Size: number of employees	No. of businesses	Employment (000s)	Turnover (£m ex VAT)	Percent Businesses	Percent Employment	Percent Turnover
1 – 9	690	3	293	53.9	3.1	3.2
10 – 49	310	7	519	23.8	7.4	5.6
50 – 249	185	22	2,051	14.5	23.5	22.1
250+	95	62	6,437	7.4	65.9	69.2
Total	1,280	93	9,300	100.00	100.00	100.00

The table indicates 1,000 firms would fit into the EC small firm definition based on employee numbers. From this UK based figure 310 firms (23.8% of total) employing 7,000 staff (7.4% of total), with a total turnover of £519 million (5.6% of total) are in the same category as the two firms interested in participation.

The research aimed to take slices through the organisation (Reeves and Harper, 1981) by interviewing people across a range of positions in the firm, in a vertical chain of command. The sample method was selected for the research due to a number of reasons including the reluctance of many small firms to participate in any form of research. Bryman (1989) writing ten years prior to this research activity notes the increasing difficulty in gaining access to firms. This difficulty is understandable due to the resource pressures imposed on small firms and the owner manager desires to see immediate



financial gain for the time and resources allocated to assist the researcher. (The ‘what’s in it for me phenomenon’.) Additionally, the research was aimed at exploring the variety of constructions offered by all employees and management in a small firm and was not bound by the need to make generalisations. This issue is expanded upon later in this chapter.

Company A was an original equipment manufacturer, based across two sites in Birmingham. The prime site incorporated the manufacturing, administration and management with the second site solely used for stock and distribution. It had strong links with Society of Motor Manufacturers and Traders (SMMT) Industry Forum, an industry-led initiative supported by the Department of Trade and Industry, designed to enhance the future competitiveness of the UK components industry. Industry Forum was launched in April 1994 and is aimed almost entirely at companies within the automotive components supply chain. Their objective is to raise competitiveness in the sector through continuous improvements in quality, cost, delivery and partnership. The forum offers two programmes to companies - Process Improvement Master Class and Supply Chain Group.

The second company, based in Milton Keynes and Telford produced brake shoes, primarily for the aftercare sales market and exported their products globally. The company employed forty staff with the Telford site being the production unit and Milton Keynes managerial and administrative. The company was experiencing some difficulties due to poor advice in the purchase, installation and running of a computer system and therefore it was mutually agreed that the research activity would be inappropriate.



The turn of events appeared apt as Company A offered an ideal case scenario having familiarity with the academic research community via previous work with the University of Central England, an apparent sustainability for the duration of the research and a motive for becoming involved.

The company was a first and second tier supplier of pressed, welded and fabricated components almost exclusively to the automotive industry. Prior to 1998, the bulk of its production was to three Land Rover models. With the re-organisation of Land Rover the case company became heavily dependant on supplying one Land Rover model. Senior management within Company A had actively participated in programmes organised by Birmingham Business link, Birmingham Centre for Manufacturing and University of Central England. In order to survive the intense competition management were seeking external knowledge.

Internally, Company A's Board were genuinely concerned that vital knowledge held by key personnel maybe lost due to the number of staff approaching retirement age. They were also conscious of pockets of knowledge that remained personal to the individual with a unique and specific role in the firm. The Board were interested in learning how to maximise on internal knowledge opportunities. They appreciated that with the broad range of individuals in the firm, from young male college trained engineer to mature unskilled female press operator that it was not an easy proposition. By understanding how employees know what they know it was anticipated that means of managing their employees would improve.



The twenty research participants represented key areas in the firm as seen in Table 2.

*Table 2. Case Study Participants Structural Representation*

	No. in Company	No. participating in research
Tool room	4	2
Quality Control	2	0
Admin staff	3	3
Goods inwards/dispatch	4	1
Press operators	6	6
Setter	4	4 (incl. 1 mig welder)
Commercial assistant	1	0
Production Engineer	1	0
Quality Engineer	1	1
Team Leader	1	0
Maintenance Engineer	1	0
Shift Controller	1	1 (works supervisor)
Tech. Commercial Director	1	1
Works Director	1	1
Managing Director	1	0
TOTAL	32	20



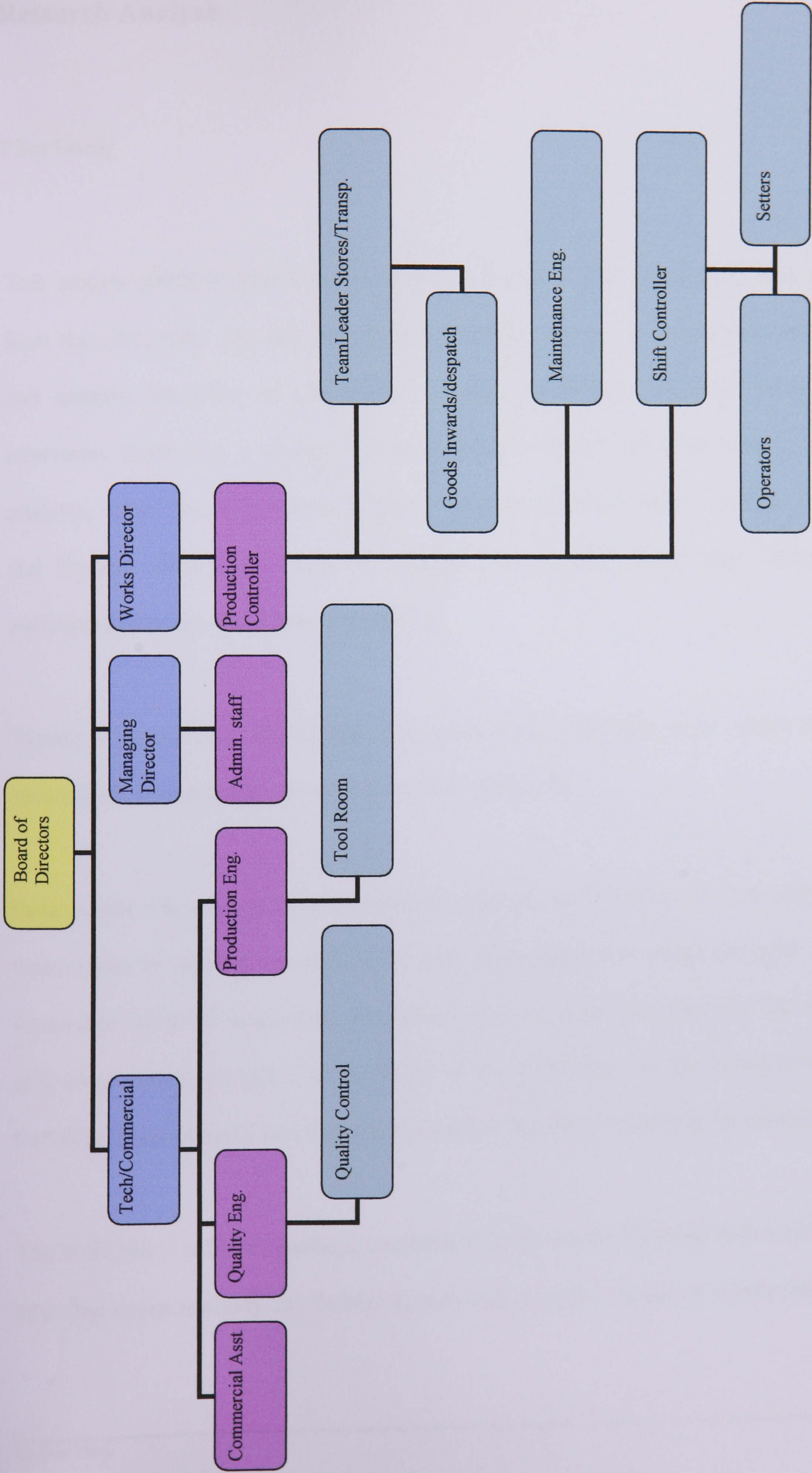
Between April and June 2001 Company A provided a total of 40 completed repertory grids from 20 different individuals and is considered an adequate sample in response to each of the issues framed by the research question. This supplied 243 bipolar constructs in the context of how people know what they know and in the context of knowledge derived from knowledge representations. The number of constructs was sufficient to enable a meaningful analysis to take place. The twenty voluntary individuals represented all the factions throughout the firm from unskilled worker to professional Works Director.

It is relevant at this juncture to provide some background to the company's structure. Two elderly brothers owned Company Case A both nearing retirement. Neither individual had ever been directly involved with the management of the company but purchased the shareholding as an investment opportunity. Their background was and remains the construction industry and they appeared to seek only a modest return from their investment. The last dividend was paid in 1997. A Board of Directors, consisting of a Managing Director, Works Director and Technical/Commercial Director managed the daily operation of the Company. The owners occasionally attended board meetings.

In the repertory grid method adopted one of the elements selected for the triadic elicitation of constructs was 'Owner Manager'. The names used by various participants for this title varied but frequently the Managing Director was viewed as 'Owner Manager'. The Company structure is detailed below (See Figure 9).



FIGURE 9 . ORGANISATION CHART COMPANY A





## Research Analysis

### Pilot Study

This section opens by detailing the method of analysis used to examine data derived from the pilot study. The purpose of the pilot study was to test the research instrument and confirm feasibility of application. In order to analyse the data derived from interviews there was a choice of five principal means: frequency counts, content analysis, visual focusing, cluster analysis and principal-components analysis (Stewart and Stewart, 1981). The mode of analysis used at Pilot Study stage incorporated participant response and WebGrid Analysis.

Timing of interviews, discussions with participants, feedback from owner manager ascertained the feasibility of research method application

Data output was analysed via participant response and WebGrid II. The participants were asked to 'eyeball' or analyse in their own words the completed grids and the researcher noted the comments. This adheres to the underlying ethos of the repertory grid conversation, in that it is the world of the participant we are trying to step into therefore it is preferable that they are included in the sense-making of the constructs.

The WebGrid II software package, available through the World Wide Web application at [http://tiger.cpsc.ucalgary.ca/ WebGrid](http://tiger.cpsc.ucalgary.ca/WebGrid), provided a useful means of conducting cluster

analysis and principal component analysis. The Knowledge Science Institute, University of Calgary and emeritus Professor's Gaines, B and Shaw, M both of whom have a long association with Personal Construct Theory, maintain the site. The web site enables the entire elicitation and analysis programme to be conducted either remotely or with the researcher present. However, the web site was not used for the elicitation of the constructs as it was felt the process would create a barrier between the researcher and the participants. That is, a face-to-face interview is preferable to the dynamics of conversing across or towards a personal computer. The web site was used for the analysis of grids which had been completed previously with participants in the traditional long-hand written format. There were a number of alternative software analysis packages, for example, Flexi Grid (Tschudi, 1990) or Omnigrid (Sewell, R K, 1991) but WebGrid II was provided at no charge and is particularly user friendly and suitable for the research situation.

The WebGrid II analysis takes the form of a principal components map (see Figure 10), using Slater's (Slater, 1977) application and a Cluster diagram (see Figure 11), using Shaw's Focus program (Shaw, 1980 page 23). The main point for all researchers to note is the original intention of Kelly's psychological geometry:  $n$  constructs are axes in  $n$ -dimensional space; elements are points plotted in that space. Principal component analysis moves the eye of the observer around in that space so as to achieve the maximum separation of points. 2-D plots are cross sections of the space. There is a need to remain distanced from the behind the scenes mathematics that create the visual representations but at the same time remain conscious of the limitations of the techniques that enable the visualisation.



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The WebGrid II web site provided an interactive interface to represent the abstractions derived from elements in terms of hierarchical clusters using FOCUS and relational diagrams such as non-hierarchical conceptual maps derived through principal component analysis. The utility these two forms of analysis offer are to validate the raw domain knowledge and to suggest further structure. FOCUS hierarchically clusters elements and constructs within a sub-domain prompting the researcher to seek validation of clusters structured throughout this domain. (See Appendix IV) The focus program calculates the correlation between the construct ratings and arranges the constructs so the nearest to each other are the most alike. In calculating the correlation the program includes the construct rating twice. PrinCom spatially clusters elements and constructs within a sub-domain prompting the experts to add higher-level constructs structuring the domain. (Gaines and Shaw, 1993). The definition of principal component analysis involves a mathematical procedure that transforms a number of (possibly) correlated variables into a smaller number of uncorrelated variables called principal components. The first principal component accounts for as much of the variability in the data as possible, and each succeeding component accounts for as much of the remaining variability as possible. The objectives of principal component analysis are to discover or to reduce the dimensionality of the elicited constructs and to identify any new meaningful variables.

A critique of principal components analysis and focus clustering software packages provided in Stewart, 1981 now appears somewhat dated with the advent of easier web links and the development of web applications such as WebGrid II. However, the point raised by Stewart in connection with comparing grids remains relevant. The cluster

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analysis need only hold constant either elements or constructs. However, the Web Grid II and III packages permit the comparison of grids based on identical elements and identical constructs, but the value of its meaning is questionable.



FIGURE 10 EXAMPLE OF A PRINCIPAL COMPONENTS MAP USING WEB GRID III (BASED ON SLATER (1977))

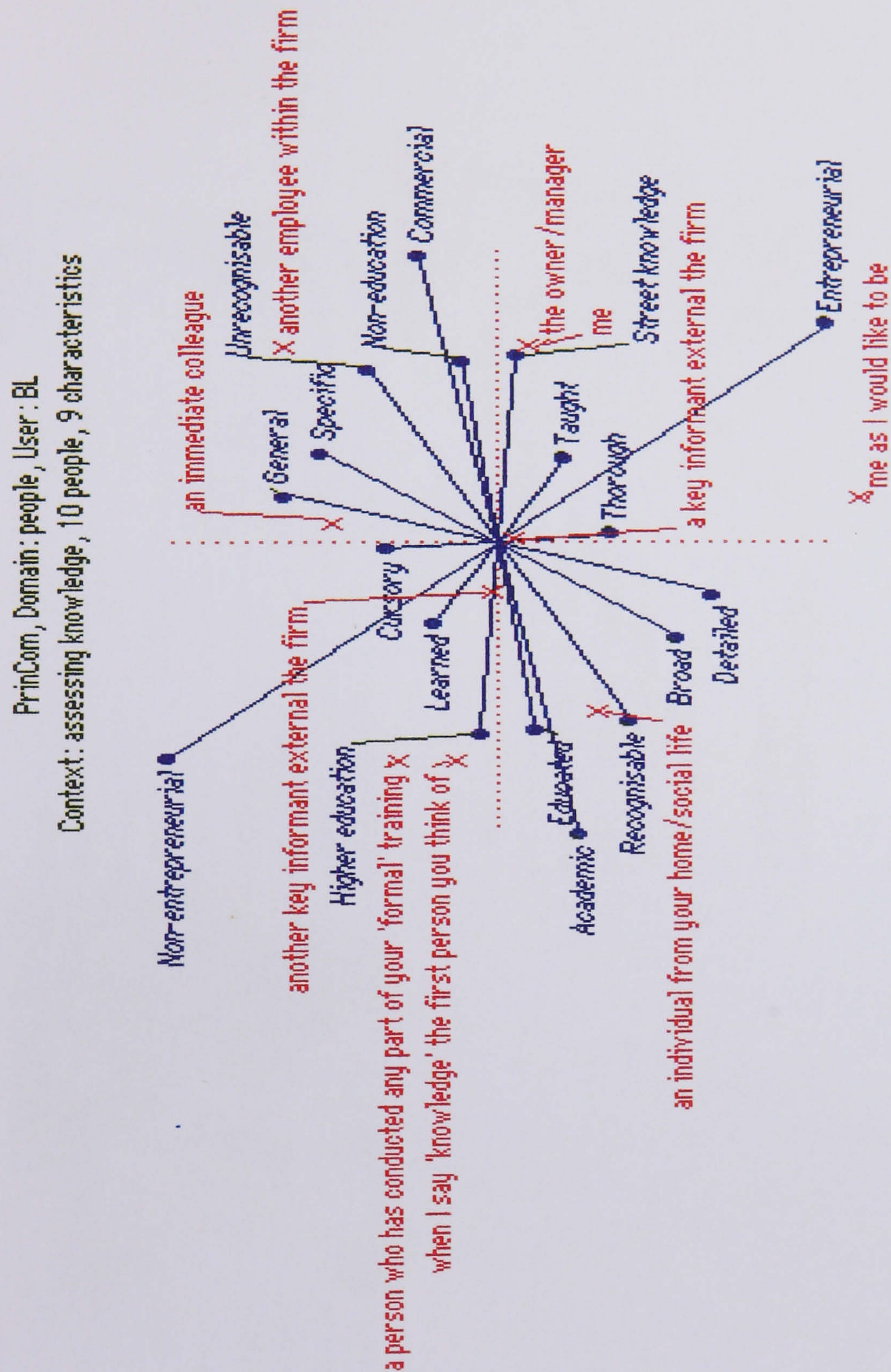
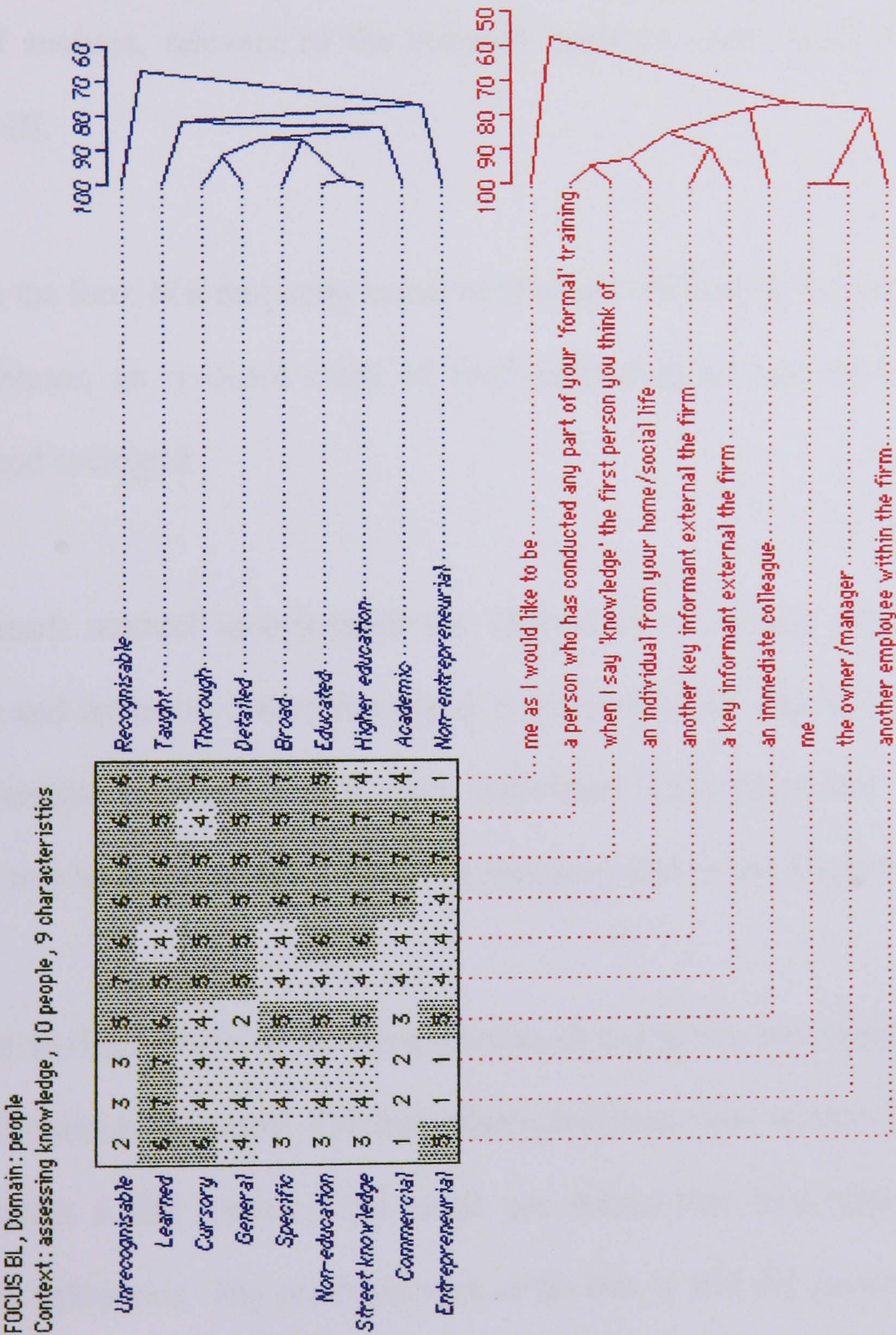




FIGURE 11    EXAMPLE OF A CLUSTER DIAGRAM, USING WEB GRID III  
BASED ON SHAW (1980)





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## Case Study

The pilot study indicated the utility of WebGrid as an analysis tool. WebGrid was upgraded to WebGrid III in the time between conducting the pilot study and embarking on the main case. The main case involved twenty participants and therefore further means of analysis, relevant to the research question, were facilitated in addition to WebGrid III.

This took the form of a frequency count of elements elicited in the context of knowledge representations, an in-depth study of each individual by way of cameos, a content analysis and sociogrid.

The research method incorporated the illustration of twenty cameos or ‘portraits’ (Hollway and Jefferson, 2000) that depict in sharp relief the individuals that participated in the research. In a small firm every individual has a prominent role to fulfil and therefore maybe at times play a small but necessary part in the function of the whole.

A content analysis involved devising a series of categories into which the total sum of constructs could be arranged. The individual constructs were written onto cards and then spread across a flat surface. The cards are sorted into homogenous piles, seeking taxonomic categories. The preferred way to do this is still the patient examination and re-examination of constructs. Once the categories had been finalised then the cards were allocated to the category that revealed the closest fit. The researcher carried out the content analysis as an individual task, but it could be completed with the assistance of a

colleague. The researcher felt that a colleague, friend or family would be so far removed from the context of the situation that their input would add little if any value to the meaning of the output. The completed content analysis is detailed in the findings.

The content analysis enabled categories of meaning to become variables for comparison. The variables can be examined in the light of existing theoretical models either supporting or contradicting what was already known. However, the significance of one construct withdrawn from the individual collection of personal constructs takes on a different meaning when seen in the wider context of everything elicited from the individual. The researcher adopted a philosophical approach that demanded individuals were also explored as a whole body of thought processes and not solely divided into convenient categorisation. This aspect is covered in the individual microstoria or cameos.

A final means of analysis was based on the sociogrid program, a technique that was seen as a useful tool to examine the meaning in groups using the same elements but different individual constructs. Its application has primarily been seen in management groups looking at training, recruitment or quality issues. The technique used the computation of the construct matching scores matrix for the combined grid as detailed in Shaw (1980). Data was first input using each hierarchical population and then as a complete view using *knowledge and people constructs* from all participants. The latter indicated communities of common warranting mechanisms that crossed functional boundaries



## Conceptual Framework to support the Research Process

Previous sections have outlined an appropriate means of responding to the needs of the inquiry. This section supports the conceptual framework that resulted in method selection, outlining weaknesses in small firm research and addressing issues of philosophical position.

### Researching the Small Firm

There are a number of limitations with previous small firm research (Curran and Stanworth, 1986, Gibb and Davies, 1991, Holliday, 1995, Burns and Dewhurst, 1996, Rosa, 1997, Hill and McGowan 1999, Curran and Blackburn, 2001). This study aimed to adopt an approach that would strengthen this research process. In particular the research method adopted included a unit of analysis defined as a representative *group* of employees and management from one small firm.

It has avoided a sample population of entrepreneurs or owner managers as if one is of the same (Curran and Blackburn, 2001). Issues explored that are relevant to the entrepreneur are also seen to be relevant to all small firm owner managers. Within the Literature Review there is a full disclosure of the researcher's stance on owner manager and entrepreneur definition.

Theory and methods used to research the large firm have previously been utilised inappropriately in the study of the small firm.

The distinctiveness of small business research is nowhere more apparent than in the fieldwork stage.

(Curran and Blackburn, 2001, p.58)

Applying research paradigms previously seen in large firm research is flawed (Burns and Dewhurst, 1996, Gibb 1992, Stockport and Kakabadse, 1991). Pertinent examples included the common scenario of researchers findings based on the analysis of audited accounts filed with Companies House.

Existing small firm research indicated a lack of insight on the part of researchers (Hill and McGowan, 1999 and Gibb and Davies, 1991). Researchers taught in the single discipline methods, for example economics, finance or law, have used their familiar models and frames and fail to question their suitability for the multidisciplinary nature of small firms. Many business academics were previously employed in the commercial sector (Cannon, 1987) but are not grounded in the world of the small business, which eradicates an irrelevant large firm mindset and the misinterpretation of responses that are related to "entrepreneurs" ego.

The frequent close association between work, social and domestic issues leads to varied attitudes to information disclosure by the owner manager (Gibb, 1992). In addition the filter of the ego and other owner manager traits have been recorded (Chell, 1991). If asked about the problems that the firm is facing it is suggested owner managers will find fault with all external factors and avoid declaring internal structural or management weaknesses.



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One can easily imagine that an owner/manager might produce two different discourses depending on whether he is at his place of business or elsewhere.

Cossette and Audet, 1992, p.329

Owner managers with a struggling firm are deemed to adopt a blame mentality rather than accept that the reason for failure is poor leadership. However, if commended on the successful performance of the firm then the owner manager is all too willing to inflate their own capabilities. Business success and growth are not always the outcome of exceptional personal capacities (drive, determination, and ambition) but a function of various forms of personal discontent and random occurrence (Scase and Goffee, 1989). It was considered preferable to involve a broader mixed population within a small firm to gain a clearer holistic picture of knowledge activity.

Some work has shown a lack of insight in the function and operation of small firms whereas others have provided a depth of understanding (Holliday, 1995 and Gibb, 1992). For example, sending questionnaires that ask, "what is your annual marketing budget?" The notion of marketing for the non-academic business owner might well differ from the researcher's understanding of the subject. Additionally, determining precise budgets in small firms is minimal. In the large firm scenario then the question may well be relevant but in small firms the practice of producing budgets bears little resemblance to the precise nature of the process practised in large firms.

Practical methodological difficulties of obtaining access in small firms enabling the research process to take place has been overlooked or poorly planned leading to a breakdown in relations with the research participants. Research that accepts and works

with the multidisciplinary context of the SME environment is likely to reap greater rewards.

This researcher devised a methodological foundation that not only suited the research question but also the context in which it would need to function. The following aims to draw attention to the main questions that arose regarding methods, models and frames of reference and multidisciplinary SME research.

### **Philosophical position**

A fundamental objective of the research method was to establish a philosophical position and reflect on this position throughout the period of study. A key to the researcher's stance is demonstrated from the very early investigative stages. In taking a view that reading literature ensures a thorough understanding of the existing knowledge in this domain but it would not make her an expert in the precise area that needed further exploration. Expertise develops throughout research and a sense of being an expert only follows with completion.

The next indicator of philosophical position was in attitude to the subjects of the research. The participants were involved in the reasoning for the research and accepted the research process without any intended pressure. Thus the participants were part of the knowledge acquisition process and then privy to immediate findings. The gain was experienced by participants, researcher and reader and not just researcher.



A further objective stressed the importance of inclusion. Research that produced outcomes only of interest to the researcher and immediate community were seen as futile. The study had a pragmatic application that encouraged participants to act as stakeholders in the research process. The stakeholder population included the ‘little people’ (Boje, 2001), that is interviews involved all levels of employee from apprentice to director. It provided a rare and original in-depth study of a small firm from the standpoint of all employees within this context. Therefore it was essential that a suitable organisation offering such an exceptional opportunity was identified. This called for a sustainable company that would survive and support throughout a period of research and was in a position relative to the initial aims of research.

An introduction to work by Kelly (1955) influenced methodology. However, it was the intention of this investigation to review Kelly in the light of subsequent philosophical work and research tools. There was neither a neat fit with a qualitative or quantitative methodology. The utility of PCT (Kelly, 1955) as a move from the discipline of psychology to the business research arena has not received tremendous enthusiasm. This research hoped to dispel the fears of other researchers and encourage a wider application. The structure of the theory is based upon a fundamental postulate, ‘a person’s processes are psychologically channelized by the ways in which he anticipates events’ (Kelly, 1963, p.46) and supported by eleven corollaries (See Appendix II).

Kelly (1955) describes himself and his supporters as *alternative constructivists* from the conjecture that there are many alternative ways of viewing the world. Notable support for alternative constructivism is seen in the works by Adams-Webber (1979), Bannister

(1970), Fransella (1978) and Stewart (1981). Kelly's disclosures on alternative constructivism allow us to assert that a real world is out there but it can only be constructed and not directly grasped in any sense of totality. Accumulative fragmentalism; the notion that truth can be collected piece by piece; can be seen as the antithesis of alternative constructivism. Kelly was critical of the practice of amassing information with resulting claims of truth based on quantity.

Parallels have been drawn between social constructionism (Berger and Luckmann, 1991) and alternative constructivism but social constructionism appears to leave little room for individual agency. The social constructionist upholds that what we take to be our reality, our 'knowledge' of an external world, is constructed essentially by social forces. According to Berger and Luckmann *ibid.* individualism is defined as unsuccessful socialization. The socialization process coming in two forms, firstly, primary socialization begins in childhood with the impact of significant others, for example, the parents and secondary socialization describing the processes anyone experiences within new sectors of society. The conclusion of primary socialization is seen to be at the point where a person recognises who they are and where in general others are. Henceforth secondary socialization continues the expansion of the socialization process. The individualist has not responded to the socialization process and is therefore disadvantaged due to unsuccessful socialization. Individuals with a private biography out of touch with the objective social-structural context will suffer because their dreams or aspirations cannot be met. The individualist is alternating between worlds that are created from a social construction. The role of the individual with a private biography appears quite impotent.



However, we are not imprisoned by social forces but instead are actively making individual meaning from the socially constructed world. Our aspirations and issues are our own but they are in the socially constructed environment. It is fortunate that Kelly has written openly and informatively not just in respect of PCT and RGT but also the underpinning philosophy.

Like other theories, the psychology of personal constructs is the implementation of a philosophical assumption. In this case the assumption is that whatever nature may be, or howsoever the quest for truth will turn out in the end, the events we face today are subject to as great a variety of constructions as our wits will enable us to contrive.

(Kelly, 1970, p.1)

### **Epistemological Debate**

The positivist paradigm has long been considered the only opportunity for advancement of our knowledge and has handsomely served the chemistry, mathematics and physics communities. Positivism upholds the view that researcher's observations are independent of his or her own values and beliefs. In other words the knowledge gained in the research is value-free. The utility of the positivist stance is guided by the demands of the research question. There are situations in all sectors of research that will call for the positivist approach

The positivist episteme advocates the breaking down a unit into fragmented parts in order to draw conclusions about the whole rather than the examination of a complex synergistic whole. The positivist paradigm encompasses the view that there is an external world that exists irrespective of the part we play in its processes. Causal links are drawn between events, which follow one another without the closer examination of multi-directional relationships. A great attraction for the positivist researcher is the

claimed ability to make generalisations from one time and place to alternative contexts. The data is reduced to its least meaningful component in order that it can be applied to as large a population as possible. Polanyi cited in Maykut and Morehouse (1994) emphasises the idea of control and authority which has heightened its appeal for the research community:

The avowed purpose of the positivist sciences is to establish complete intellectual control over experience in terms of precise rules. Further, we should only have to follow the rules faithfully to understand this world.

(Maykut and Morehouse, 1994: p.15 cite Polanyi, 1958).

It should not be presumed that this long-standing relationship with the scientific method is globally applied. It is predominantly a paradigm associated with the Western Hemisphere that is increasingly under pressure from an alternate view of the nature of the multi-racial interwoven world in which we live. Detached treatment of people from their social contexts is unrealisable and this includes the researcher (Hussey, 1997). It is imperative that research incorporates the participant's own perceptions of the activities they are involved in. There is a need to understand human behaviour by empathising with the participant's own frame of reference (Hussey, 1997); this mindset sits at the opposing end of the methodological debate.

### **Epistemological Debate and SME research**

A qualitative versus quantitative debate continues with some propounding the suitability of the qualitative paradigm for small firm research (Holliday, 1991 Ram, 1994, Perren, 2000). The continued exposure of quantitative methods applied in unsuitable instances is blamed on the evolution of small firm research. Holliday (1991) condemns small firm research as remaining positivist, repetitive, quick and risk averse. There is a need to



conduct research under both paradigms. There is value in for example Storey et al (1987) positivist approach to predicting growth patterns in SMEs but also value in sociological qualitative work such as Scase and Goffee (1989).

In order to respond to the aims of this research the philosophical label of alternative social constructivist (Kelly, 1955) was adopted with empathy for a qualitative paradigm. In that a major reason for doing qualitative research is to become more familiar with the phenomenon under investigation. And as a qualitative study it did not start with a preconceived hypothesis. Its intentions are a 'thick description' (Geertz, 1993) of how people construe how they know what they know – their epistemological stance. It is not thick description in that it exhausts the subject matter to the point of minutiae of irrelevance but thick in the sense that it scans the different facets of the social matrix (Denzin and Lincoln, 1994). Thus included within this thesis is a full account of the context, intentions and meanings that organised the work and processes involved.

We behave as a scientist in constantly seeking to consolidate, revise or dispel aspects of our world. The emphasis here is also on our world, it is a world where we are involved in its making. A world that is not out there in the positivist sense, waiting to be discovered but a dynamic world that is construed both socially and personally, waiting to be formed.

There was a need to view knowledge from the perspective of for example toolmakers, press operators or administrators using their language structured by their construing hierarchical system. It was intended in a phenomenological sense, as a commitment to

the actor's perspective (Bryman, 1988). Although this may have lead to a situation where output extracted would not fit precisely with academic models and existing frames of knowledge. The language and phrasing would differ from that of academics but it remained important to tease out the sense of expressions and analyse them in comparison with existing knowledge theory.

This philosophical position has shown a preference for inductive reasoning as a naturalistic researcher unable to work within the deductive framework with its 'predetermined procedure of investigation' (Gillham, 2000, p.6). It was a move from the naturalistic researcher's findings to a definition of what has been found as 'inductive theorising' (ibid.p.7). The alternative is the deductive approach of moving from the testing of existing theory by the hypothetical method. In agreement with Gibb (1992) any debate regarding preference or suitability for inductive or deductive methods is "fruitless" due to value and quality in both.

### **Alternative epistemological research**

The researcher, for this Phd approached a scenario not as an expert but as an equal, looking for meaning arising from the temporary acquaintance brought about by the research process. Meaning in response to aims and objectives was unlikely to be forthcoming if it followed the quantitative reductionist route. A view supported by Banister (1981), Jankowicz (1991), Maykut and Morehouse (1994), Morse (1994) and Reason and Rowan (1981).



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This research activity may have been carried out by either: accepting that there is some given authority on how to structure our lives in order to gain a sense of order *or* learn to live without objective truths, without knowledge linked to authority, satisfied that all we know of the world and of ourselves in it are the by products of ways of getting on with one another (Gergen, 1992). The researcher looked for meaning and understanding, from the participant's own perspective, therefore it would have been wrong to enter the research context from a position of authority aiming to control the output from the participants. The researcher felt greater affinity to the second option as it was accepted that all we know of the world is socially constructed and is constantly being revised, reviewed and renewed. We are not acted upon by our environment but involved in its making. We are working out the nature of our environment not in the robotic sense of motive, drives and impulses. We are in business to make sense of the world and using that 'sense' to anticipate the future (Bannister and Fransella, 1986).

The advantage of alternative constructivism is it is founded on a 'detailed and epistemologically convincing theory of knowledge' (Jankowicz, 2001, p.61) and 'on a theory of change' (Easterby-Smith et al, 1996, p.26) and thus well suited to the commercial environment. Warren (1998) concludes that PCT is 'most commonly described' as a phenomenological theory and a qualitative technique, which has the option of analysis by the provision of a mathematical representation of results.

### **Theoretical Underpinning**

There were three theoretical domains linked to this research. The first involved that of knowledge definition secondly knowledge epistemology and the third small firms.

Research connected to small firms has not been based on an identifiable and reputable theory. Instead, researchers have attempted to use theory from other disciplines (Joyce et al, 1996). There is little chance of a theory without a 'holistic' model of the small firm and many academics working in SME research indicated a preference for bedrock of knowledge from which future research can transpire and discomfort with the lack of pertinent theory. The apparent individual nature of the small firm has blighted attempts to build a recognised model of the small firm. Morse (1994) comments generally on the need in all research for an established theory to enable further theorising to take place. However, Morse has highlighted the error in considering theory as fact and warns of the dangers of forgetting that the established theory is merely a tool to enable the development of new knowledge of the phenomena. The hypothetical-deductive; or scientific methodology always begins with a description of the existing theory. Jankowicz (1991, p.82) describes theory as 'a formally expressed general statement which has the potential to explain things'. This definition appears to agree with Morse's advice not to consider theory as fact.

Small firm research remains a nascent discipline where a certain discomfort may arise with the freedom to be a part of developing small firm theory as against hailing existing theory. Economists have been decried for their attempts to apply traditional economic theory developed from work with large firms to new small firm research situations (Gibb and Davies, 1991). However, this approach by economists may still prove useful in the examination of a particular aspect of the small firm within the guiding framework of a single-discipline theory. On condition that the user of such theory appreciates that it is a tool to assist them and not an objective truth relative to their context. Rosa's (1997,



p.310) exploratory view of research into entrepreneurship and small businesses is less concerned with the absence of theory but pleads for quality in data collection. He emphasises the utility in good quality data and accepts the slow development of 'sound theoretical advances'.

### **Causality and Correlation**

The research methods adopted are not seeking a causal relationship between activities and knowledge. They aim to suggest a relationship between knowledge constructs and the design of management processes. Denscombe (1998) summarises the distinction between a correlation being a likelihood of a relationship and a cause, which indicates a dependent and independent variable. The theory of causality is outlined in Reason and Rowan (1981) describing its links with positivist epistemology. The argument against adhering to this research habit is due to the emphasis on outcomes;

....causal processes occur only in individual beings, since mechanisms of actions, even we act as members of collectives, must be realized in particular persons

(Reason and Rowan, 1981, p. 13/14)

Misuse of cause-effect is observed in conclusions of entrepreneurial characteristics where the characteristic 'achievement motivated' (Gibb, 1991, p.140) is deemed cause for the success and not possibly the result. Also, efforts made to justify money spent on small firm research has lead to research concluding positive effects for government sponsored interventions that cannot be isolated and measured in such a hard format.

## **Rationale and Implications of Data Collection**

### **Introduction**

The main research methods detailed by Jankowicz (1991) are the historical review and analysis, the case study, the survey and the field experiment.

The historical review and analysis would have been a useful method if the research question aimed at unearthing the reflective accumulation of knowledge over a person's life. For example, the examination of what people perceived was their warranting mechanism when they left school compared to what they use now.

The use of case study in small firm and SME research has increased as the paradigmatic acceptance of the individual nature of each small firm gathers momentum. The term survey is synonymously linked with volume and the research possessed resource restraints. An unstructured interview carried out on a survey basis would have produced vast amounts of data and taken considerable time and funding. A structured interview would ease the process of interview and the means of data analysis but would provide less meaning in response to the aims of the research. However, repertory grid permits an examination of participant's meaning rather than following a familiar qualitative route of question and answer which assumes a shared meaning attached to pre-ordained questions (Hollway and Jefferson, 2000).

The researcher would need to compile the structured interview instrument and therefore use the researcher's vernacular. This appeared contrary to the intentions of the research.



Later in the research process a further consideration was given to the survey method using the constructs expressed by the case study participants. This is discussed further in Chapter 5. The main disadvantage of the survey was seen to be the weakness of reductionism.

Jankowicz (1991) final suggested method is field experiment. Here it is necessary to pinpoint precisely what is being tested, that is, the key variables that are of interest. In the highly dynamic and complex changing business environment it is controversial to examine an isolated variable disconnected from the interwoven business framework, hence a growing interest in holistic case study work. Knowledge was not seen as an isolated variable in that its form would undoubtedly be made up of many parts. This research demanded an in-depth embedded participation therefore it was essential to move the research into 'the field' in a small firm contextual domain. However, it was clearly not a test that was being conducted but a conceptual study.

The rationale and implications of each selected research method are now discussed in greater detail.

### **Alternative methods supporting PCT**

The adoption of a PCT paradigm may have lead to a selection of methods in addition to RGT. For example, self-characterisation is a form of written self-assessment, an opportunity for the individual to reflect on how they see themselves in the world. It is a tool that adheres well to Kelly's first principle of asking people to describe for

themselves how they see a situation or problem. The researcher makes the following request:

I want you write a character sketch of (person's name), just as if he/she were the principal character in a play. Write it as it might be written by a friend who knew him/her very intimately and very sympathetically, perhaps better than anyone ever really could know him/her. Be sure to write it in the third person. For example start out by saying (Person's name) is.....

The researcher's aims would be to appreciate how the participant structures their world and perhaps what strategies are used in relation to this world. The method provides a tremendous opportunity for the researcher, not to count the number of adjectives, verbs, guilt vocabulary or emphasis on power and so on. Instead the researcher obtains an overall picture of how that individual sees themselves in a world that has meaning for them. Self-characterisation has great appeal but its greatest disadvantage in the context of a small manufacturing firm was the need for the individual to write and express themselves in the literal form. It was anticipated, a research sample from a mix of skilled and unskilled labour may not be able to fully participate. However, the method certainly has scope in business research and further exploration of its application is to be encouraged. For examples of self-characterisation see Mallick and Watts in Scheer (2000) or Fransella in Bonarius et al (1981) and for a detailed explanation of the means of analysing the self-characterisation tool, Neimeyer (1993).

Ravenette (2000) responds to Bell's (2000) eulogy of computerised PCT applications by stressing the need to refer the grid back to the contributor to invoke further illumination and questions the suitable use of computers and their output in particular contexts. An extreme example of a methodology derived from PCT that does not utilise any form of



computation is the use of drawings in contrast to verbal labels as designed by Ravenette (1999). In Ravenette's view the constructs are experiential and only reduced to a verbal representation for convenience of sharing. The researcher is not aware of any application of this method in the field of business therefore is unable to comment on its suitability. It is suggested the request for people, working in a small manufacturing firm to create drawings as a means of exploring their meanings would be novel but also extraordinary for the business environment. However, it is useful to highlight once again that the constructs are only words because the researcher has requested they become explicit and behind the discrimination is the personal emotion, feelings and experience that has helped the individual to form, validate or invalidate their viability.

Further methods based on PCT include Finn Tschudi's (1977) ABC Model, which was developed to identify the advantages and disadvantages, to the participant, of being at one end of their bi-polar constructs or the other. The form of Fixed Role Therapy (Kelly, 1991) where participants use role play to picture themselves in a new environment and variations on a theme of the original RGT that look at change or learning.

Jankowicz (2001) and earlier by Stewart and Stewart (1981) both outline simple examples as a means of introducing the technique. Daniels et al (1995) provides an example of the repertory grid method being timed in comparison with another method, in this case, a visual mapping procedure. In this particular instance the repertory grid is estimated to take between 15 and 20 minutes to administer compared to 30 seconds for the visual mapping procedure. However, RGT is recognised by Daniels et al (1995) to

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elicit 'deeper knowledge' and 'deeper conceptual relations' so other researchers need to perhaps consider whether the 20 minute wait is considered valuable.

All these methods were considered but the most suitable method, in response to the research question, within the PCT paradigm was an adaptation of the original format of RGT incorporating specific software packages and content analysis.

Repertory Grid Technique is a method and not a test. It is a skilled and focused conversation and often described as an objective way of exploring someone's subjective reality. In analysing any grid material the first person to validate any interpretation is the person who completed the grid. The grid reliability is entwined in grid elicitation and the aim of the researcher is to behave like a mirror, allowing the interviewee to reflect upon their meaning. A qualitative intervention occurs when the researcher inputs the data and draws meaning from the resulting analysis or conducts the content analysis. To re-iterate, Bannister and Fransella (1986) state that since the technique is not a test and does not have a specific content, its validity can only be referred to in the sense that we can question its capacity to reveal patterns and relationships in certain types of data.

In the examination of the method a judgement on the basis of reliability should be considered sensibly into the way in which people maintain or alter their construct. Bannister and Fransella (1986) advocate estimating the value of the grid not by reliability, but by its capacity for effective enquiry into the problem at hand. Despite the level of argument to the contrary, some authors are reported by Smith and Stewart (1977) to have attempted to access reliability of the grid by conventional methods such



as test- retest. It has been suggested however that completion of a grid is change provoking in itself and that this factor alone influences the way in which subjects respond on re-administered grids, hence producing something of an unreliable indication of reliability.

Whatever, 'reality' is it is only apprehensible through people's constructions of it. Thus research in the social domain cannot reveal any 'true' authoritarian laws but only people's socially and experientially based constructions of it. All men are scientists in that we seek to inquire and the 'scientist' merely formalises the process. The process of the research event could lead to the construction of alternative, revised or extended constructs on the part of the researcher or participant or both.

### **Repertory Grid Technique and Business**

This study encourages fellow researchers to consider the application of a research method that was originally outlined nearly fifty years ago by Kelly (1955). Therefore it could be suggested that this methodology is perhaps out of line with that of the dynamic changing global commercial environment faced by small firms. However, the Online Public Access Catalogue of the British Library reports eight new books were published in 2000 in connection with Personal Construct Theory and a further five were published previously in 1999. There is a steady number of journal articles and theses published annually demonstrating the utility of the method in such diverse areas as investment appraisal (Harris, 1999), ethics and fair work (Singer, 2000), tourist images (Coshall, 2000) or traditional areas of psychology (Yeung et al, 2000). Watson et al (1995) have examined the meaning of entrepreneurship for owner/managers and Jankowicz (1987)

interviewed commercial loan officers with respect to small business loan applications. Thus the use of RGT with owner managers and their employees remains sparse. However, examples of a constructivist paradigm in business research are apparent.

Between 1987 and 1998 five doctoral theses with a constructivist philosophical base and a business element utilising repertory grid technique were successful. Including a study of enterprise trainees (Gray, 1994), social relevance of postgraduate management education in India (Vyakarnum, 1987) and a critical investigation into the educational needs and interests of owner-managers of small firms (Mahmood, 1992). More significant is Lees (1997) study of knowledge workers who, it argued, act as a dynamic and creative resource for the modern organisation. Finally, Coxhead (1998) looked in detail at how both mission and stake holding are applied in an organisational perspective. Vyakarnam and Gray both eminent in their field, have continued to quote from Kelly's work in their more recent writing. Thus, it is proposed that we do not regard their work as being out of date because they have utilised and in some cases adapted a methodology that provides insight without imposition. The research output from Gray (1998) has value and meaning even if he still hangs on to the philosophical underpinning of Personal Construct Theory, Kelly (1955) and repertory grid technique.

Personal Construct Theory and in particular the use of RGT, the instrument for construct elicitation in the study of management theory has many committed followers including Anderson (1990), Easterby-Smith (1996) and Jankowicz (2001). Stewart (1981) was one of the early proponents of the wider application possibilities of Personal Construct



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Theory and the use of repertory grid technique beyond pure psychology and into the business arena.

Interpretations of constructivism have varied since Kelly's (1955) original work. Hill and McGowan (1999) have referenced the work of Lincoln and Guba (1985) and Eisner (1991) as providing the constructivist paradigm. It is agreed that Lincoln and Guba have an empathy with the constructivist approach but their renowned work has a stronger sociological structure compared to that of Kelly. The ontological stance of the research undertaken by Hill and McGowan claims to be constructivist with the view that the researcher has to represent the world of others. It also proposes it is acceptable for the language of the analysis to be reported in the first person. In summary, there appears to be a peculiar interpretation of constructivist akin to Hill and McGowan, from the sociological perspective seen in Lincoln and Guba but advocating an individualistic practise on the part of the researcher. There appears to be no indication of commonality amongst these multiple realities, that is, where do the multiple realities converge? Additionally, a question arises as to whether Hill and McGowan acknowledge the impact of social forces as highlighted by Lincoln and Guba (1985) who commend the social construction of meaning.

Developments in the application and analysis of RGT are encouraged (Easterby –Smith et al, 1996).

People can develop unreasonable expectations and then become disappointed by the output from PCT and RGT (Easterby Smith et al, 1996). This can be the case when the

repertory grid has been conducted without any consideration for the underlying theory. The researcher needs to appreciate the philosophical basis of the theory so that the areas for study or the recommendations arising from findings are not conflicting with Personal Construct Theory. Too often the appeal of RGT has been in the quantitative analysis made available by the rating or ranking of the grids and the attractive software that is being developed. Thus the output begins to resemble a test rather than a technique (Fransella and Bannister, 1977). The RGT should be used qualitatively with the researcher accepting the accounts gained are subjective and the participants treated as complex beings rather than reduced to isolated variables (Cornelius, 2000, Neal and Tyrrel, 1979). The confused classification of the methodology as a positivist tool has arisen due to the numeric element of the repertory grid.

It must be remembered that these numbers carry no inherent meaning but simply provide a way in which the participants can position elements in relative terms on each of the dimensions and so expose a slightly richer picture.

Banister (1994, p.77)

The use of the term 'personal' to describe the theory has resulted in considerable academic squabbling across all disciplines. The Easterby-Smith et al (1996) monograph continues to highlight the individuality of the findings and the weaknesses inherent in any attempts to generalise. Rychlak (1990) was adamant that PCT emphasises individuals as agents of their own actions and not shaped by social construction. Indeed, an initial examination of Kelly could incorrectly suggest the deeply individual subjective postulate would not permit any sharing of common understanding to concede to elements of a real world. However, the three corollaries, individuality, commonality and



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sociality provide an integral relationship. Thus theoretical support is provided within PCT to study individuals and groups and to compare them (Reger, 1990).

The aspect of 'personal' referred to in PCT is centrally of people in relation to others, people are both fashioned within and fashioned of the complex interpersonal worlds they have inhabited and do inhabit (Kelly, 1955). There is neither a pursuit of a general law to frame all people or a humanistic approach stressing the difference from others, as if autonomy was the goal of effective living (Walker, 1996). Kalekin-Fishman & Walker (1996) provides many excellent examples of the utility of PCT inclusive of the social world.

RGT was initially designed for the evaluation of personal meanings and when faced with group situations the technique does need some adaptation (Feixas, 1992). The provision of identical elements is somewhat problem-free but the same cannot be said of constructs as the basis of PCT is that constructs are highly individual. Several research methods have been proposed by Feixas and practised with varying degrees of success. A recognised authority in the field of group grids is Shaw (1980) who demonstrates the sociogrid software package in the case study Marathon Knitwear and Tschudi (1990) offers the multigrid software analysis tool.

Alternative methods of analysing the constructs from individuals in groups can be seen in a recent paper by Jankowicz (2001) who illustrates the use of content analysis to determine the more frequent and conspicuous constructs held by a group involved in small business lending decisions. Previously, Fransella et al (1988) developed a method

of construing constructs individually and then with the group analysing the results to create a construct to describe the sum of the individual constructs. The group then worked again as individuals to rate and rank the 'group constructs'.

Undoubtedly, Easterby-Smith et al (1996) are correct in their assessment of RGT as proving particularly relevant to individual's decision making, self-development, and performance appraisal or selection procedures. However, there have clearly been a number of successful applications to a business group situation that have resulted in new insights of great utility (Reger, 1990).

### **Analysis of Repertory Grids**

In its purest form, the completed grid was analysed by the participant 'eyeballing' the completed grid exposing their meaning. Each participant was invited to look for and communicate their thoughts on the order and pattern revealed by the grid. Banister (1994) suggests, if the participant does not identify and verbalise connections or insight from the grids then it is not the duty of the researcher to voice them. In other words if the participant does not provide an interpretation of the grid then the researcher should not attempt to impose an interpretation. The participant's confirmation of the findings from the completed grid provides assurances of validity. The participant was encouraged to comment on what they saw in the patterns that evolved from the process. This confirmation exercise proved valuable in serving as a learning conversation for both parties.



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## The Case for One Bounded Context

A case study may consist of a single case or multiple cases. The utilisation of one bounded context, as in this research, is something that many would question and needs further explanation. Yin (1994) distinguishes this as an embedded case study with participants as unit of analysis. The issue to be examined was best approached by looking in depth at one company rather than attempting any comparative or multiple case analyses. A substantial group of twenty employees from one company offers more in response to the research aims than interviewing twenty employees from different small firms.

It is apparent that more and more small firm and SME research is based upon the ‘convenience sample’ (Bryman, 1989, p.113). The difficulty of access to owner managers and employees for researchers has increased the propensity of research to focus on willing participants who have the available time and resources to enable inclusion in any form of research (Curran and Blackburn, 2001). However, in this instance finding one company with a management willing to provide access to a wide selection of employees was not based on convenience.

The purpose of the research was not to make a comparison of knowledge constructs with another perhaps poorly matched firm. Additionally it is not a multiple case study with a multitude of sub units. This would require both a within case analysis and a cross case analysis. Likewise the method is not based on a quantitative system of logic sampling theory.

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It was the opportunity to delve deep into the examination of knowledge validation in one firm and link this to existing theory of knowledge in the literature. The method used a research setting that was sufficiently small to make extracted data manageable but sufficiently rich to permit an extensive analysis of the constructs from the cross section of individuals in the one firm providing a rigorous examination of data (Holliday, 2001). Patterns emerging from one bounded context were sufficient to preclude the necessity of a further case as patterns in the one case studied show links with extant literature that strengthens the external validity of the conclusions.

The accessibility to such a large proportion of staff was always going to be difficult therefore Company A offered an ideal opportunity to examine the notion of knowledge in a small automotive component manufacturing firm. The company presented itself as a rare small firm research encounter.

The incidence of using a single case is reported by Hamel et al (1993) who questions the point of representativeness when it is unclear what we are trying to represent. But it remains in the academic community that there is comfort in numbers. This point is emphasised by Gomm (2000, p.53) who details the anecdote of a researcher giving a ‘knee-jerk assessment’ of a fellow qualitative researcher’s work by decrying the value of the output because the work was based on a single classroom group.

One case is seen as a poor basis for what is recognised as generalization to a larger population. It is this issue of rationalistic generalisation that is the troublesome notion to justification for a single case. Rather than generalisability in any qualitative research of



this kind what is proposed is *transferability*. Transferability represents the degree of transfer,

.....between sending and receiving contexts where the sending context is that of the researcher or inquirer. The study must then be defined and described in sufficient rich detail, so that receivers can make judgements about transferability.

(Guba and Lincoln, 1989, p.241)

It is an attempt to shed light on what is unique in time and space, while at the same time conveying insights that exceed the limits of the situation from whence it emerged (Hill and McGowan, 1999). In shedding light on knowledge epistemology in a small firm it was imperative that enough information on the process, people and context was provided to suggest how likely it is that a further study with different participants would produce similar results.

### *Process*

Relevant theory is highlighted in the literature review which informed the process but did not dictate it. A methodology is thoroughly detailed with the methods of analysis explained. The small firm entity and the participants representing various functions across the organisation under examination are all well defined. The tools used to conduct repertory grid interviews are well documented and with the onset of world wide web easily accessible. The process provided a framework for the undertaking but it was not designed to dictate the acceptable data and included contributions that would not fit any preconceived hypothesis.

### *People*

Participants, not determined by race, gender, nationality or ability were seen as individuals and then situated within a social domain as part of their everyday hierarchy

and also as part of a wider community. Repertory grid technique in relation to knowledge and people used element titles that could be used in many different small firm situations. For the individual participant the technique allows a personal construing that is meaningful for them by requesting personal labels are applied to each of the element titles. But by sharing the construction in relation to the element role title with the researcher then data can be shared. An increase in variables arises when elements themselves are also elicited as in the examination of knowledge and artifacts but this can add to the richness of the data.

Participants can be provided with elements or they can be elicited. Participants are not generally provided with constructs as eliciting constructs is the crucial personal data that opens up the intricacies and subtleties of the inquiry. Participants use their own dialectic in their construing and later in their analysis of their own completed grids avoiding an overly intellectual bias.

### *Context*

The context of small firms is reported in the literature review and further detail with regard to the specific case is provided in the methodology chapter.

It is reasonable but not certain that a receiver seeking to apply conclusions drawn from this case to another having acknowledged the senders detailed description of process, people and context may discover another firm shares the newly discovered characteristics. This assumes a relative degree of 'fit', that is, there are more similarities than differences. Plus the similarities are more relevant to the conclusions than for example sharing a postcode. In addition the conclusions drawn from this study should be



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considered plausible as stand alone statements as the conclusions are further supported by existing externally valid material.

### **Cameos**

The use of portraits to examine the complexities of a group was first pioneered in the early eighties (Lawrence-Lightfoot, 1983). Its justification as a qualitative research method received further attention with the later publication, Lawrence-Lightfoot and Hoffmann (1997).

However, the image of a narrative portrait is potentially more akin to the 'rich description' of social constructionist Geertz (1988) than the focus of a cameo. Both styles being rare in business research despite their appearance in other social science studies. The use of the term cameo in business research appears to represent a walk on part by a prominent individual (Teare and Rayner, 2002).

The cameos, in this research are described as such for two reasons. Firstly, it provides a flash of insight for the participants in that they are momentarily engaged in understanding and sharing something of themselves that they would not generally consider. The repertory grid conversations prompt participants to focus on a specific aspect, thus the cameo is in a sense a form of prominence from the whole. This research provided an opportunity for participants to air their grounds for knowledge in an emancipatory sense as seen in the mapping of idiosyncratic schema (Cossette and Audet, 1992).

Secondly, the participant is seen by the researcher as taking a cameo role in the research process. Appearing in the research process as a vital contributory to the group but as an individual with individual meaning. The participants were not key informants to the research process as often prominent in the ethnographic tradition selected for intensive and focus interviewing (Morse, 1994). Instead every participant had a key role to play in informing the research.

The cameos not only represent the management but also ‘little people’ (Boje, 2001) who seldom appear in the ‘grand narrative’ (Boje, 2001) of SME research. SME research has predominantly involved owner managers and other senior members of staff all too frequently excluding the micro stories of others. This research aims to avoid the summation of the meaning of knowledge into the constructs of the few by incorporating stories from all areas of the company. The cameos are given equal treatment with the output a true reflection of the narrative that took place regardless of the participant’s status. The cameos stand ‘side by side’ (Boje, 2001) aiming to reconstruct everyday life. The cameos could be described as a form of microstoria analysis (Boje, 2001) providing an insight into the workaday mix of meaning that took place between individuals working in a specific context. The repertory grid conversations provided a structure but were invariably embellished by personal micro stories.

It seems to me that if we in organizational studies only analyse organizations through the ‘elite’ stories of its CEOs, owners and managers, we miss the survivals of ‘popular culture’. We could therefore study temporary employment, secretaries and janitors to get at alternative cosmologies of the workplace

(Boje, 2001, page 54)



But whereas the microstoria analysis of Ginzberg (1980) has abandoned the social construction of meaning with accusations of the creation of a macro societal narrative this research still holds with the constructionist ontology.

Additionally, one version of research is to see through the world through the eyes and mindset of others (Boje, 2001, Kelly, 1955) but microstoria analysis aims to embrace this notion without critique or amplification of contemporary theory. In contrast, here the cameos illustrate meaning not previously engulfed by the existing theory. The researcher is still seen to play an active participative role in a holistic study of each and every cameo seeking to combine their meaning with minimal reductionism.

### **Researcher values and ethical standards**

The inclusion of a reflexive account would be uncommon in large firm research but is seen occasionally in small firm qualitative studies (Anderson and McAuley, 1999, Leonard and McAdam, 2001). Silverman (2000) suggests producing a “natural history” of ones research journey in place of a formal methodology chapter. This would include a personal context of the research and highlight the trial and error development of the whole research process. This study is clearly supported by researcher biography but not dictated by this biography. Capturing the views and values *held by participants* was considered of greatest importance and value in responding to the research question.

Utilising PCT upholds the view that the researcher approaches the situation not as an expert but as an equal. Kelly (1977) warns of seeing an event or person only from the

outside if the researcher stands aloof. He also describes this practice as resembling being a bystander to the circumstances rather than involved and committed.

A man who experiments as a way of coping with his life may devise something new, but the fellow who is merely an experimentalist can scarcely hope to see anything that he does not already presume is there.

(Kelly, 1977, p.12)

The participants are striving to understand each other therefore the commitment to the research has to be equal. Social research needs researchers who see themselves within the environment and not experimenting upon it. The art of good research is to balance the feeling of purpose and expectations with empathy for those willing to be engaged in the research, less a sense of power pervades the relationship.

Pragmatically, in the realm of the small firm it is difficult to sense the power of the academic when such considerable negotiation has pervaded the research engagement. The need for accessibility can be problematic in the study of the small business where the time and resources available to the owner manager are limited. Nevertheless, the advantages in participating in research are highlighted by Banister (1994) who suggests the research process offers all who take part the opportunity for new understandings and self-development.

Hammersley (1992) has critiqued the notion of power in relation to ethnography and the output is relative to research practice in general. Further support for the collaborative, enabling production of meaningful social research is provided by Maykut and Morehouse (1994). Bryman's (1988, p.46) terminology in reference to qualitative research is an indication of the unfortunate embedded notion of power held by the



research community, 'the interviewer's surrender of her control of the interview session'. The impact of the research on the participant incorporates the respect held for the recipient as an empowered individual equal to the researcher. The knowledge held by both parties is not individually superior, just different. The construct elicitation has at its heart the aims of the ethnographer – to keep text anchored in the emotions and feelings expressed by participants (Fletcher, 2002).

The impact of all the various research techniques, on the participants, demands closer attention. It is emphasised that all research should be engaged upon with the notion of the possible effect on the participants, which should not always be considered beneficial or wholly satisfactory. In particular with the powerful tool of repertory grid, one can discover an individual's core constructs, that is, ones that are both fundamental to the individual's interpretation of the world and difficult to change, are inadvertently revealed. The term 'inadvertently' is used not to suggest that the person is mistaken in what they say or that they have no control over their revelations, but to caution the researcher to be sensitive to these situations and be prepared with some supportive strategy (Banister, 1994). Brook (1986) also reports on this situation arising in a study designed to measure the effectiveness of a management training programme when highly personal information was obtained which could have been useful within the organisation.

In this instance the strict ownership of the information was clarified to avoid any serious ethical dilemma. Participants were all provided with a signed copy of the approval of the research activity by authorised signatories within Business and Law Faculty, De

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Montfort University. This provided assurance that the research project complied with the Market Research Society Code of Conduct as published in their revised July 1999 statement; in that respondents received a verbal statement that their co-operation in the study was voluntary and that unless otherwise advised their anonymity would be preserved. The participants all received a full explanation as to the purpose for which any information was being collected.

In writing up the research activity the exact company title was withheld and the company only referred to as Company A. During the research activity names of participants were not recorded only their job titles. Feedback material supplied for distribution following the research would remain anonymous. Participants would only have access to their own data. Therefore, the intention was for all data to remain completely anonymous and not reconstructed to reveal the identity of the participant and thus not constituting personal data as defined by the Data Protection Act (1988) which came into effect on 1 March 2000.

Values of the researcher intercept at many stages in research. In seeking any form of generalisability, natural or otherwise, researchers can only identify the method of abstraction that was used. If another researcher were to approach the situation it is feasible that they would determine the concepts in some alternative fashion. This work has relied on an abstraction from the real world that is out there (real in that it cannot be wished away) (Berger and Luckmann, 1967). Elicited constructs are real to the participant even if they appear unrealistic to the listener or reader.



Research conclusions expose an abstraction which is the merger of researcher construing and that of contributing participants. This abstraction process will determine differences and likenesses as an interpretation of the gathered data. Differences, in order that issues could be separated and thus provide clarity and distinctiveness. Likenesses, in order that issues could be placed together. Researcher interpretation will also lead to certain issues being left out all together, considered outside the scope of this study and beyond the range of convenience (Kelly, 1962).

This conceptualisation of knowledge epistemology in a small firm can only be described in detail and explained to a certain point – it is not absolute justifiable fact in an unbending concrete state. As stated in the previous section a certain level of responsibility is maintained by the sender of research statements and a further responsibility is transferred to the receiver seeking to apply some generalisation. Thus a certain trust by the receiver has to arise in the worthiness of researcher values.

This study aims to provide a move towards an operational detailed examination of how a group of small firm management and employees know what they know. In doing so researcher values are exposed as her personal construing led to this sensing of a need to uncover the research question. Her personal construing works in tandem with a socially inspired need to classify and measure our world.

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## Justification for Knowledge Claims

Previous sections have outlined the techniques used to gather data. The techniques are reviewed in light of their guarantors for new knowledge claims. All research techniques need to encapsulate the issues of validity, reliability, representativeness and generalisability in some form or other.

Taylor (1990) views the notion of validity as a threefold process in the qualitative epistemology: validity as lived experience, validity as consensus and validity as probability. Kelly (1955) proposed validity be viewed in the more practical terms of usefulness and refers back to the fundamental postulate and the anticipation of events.

Knowledge may be judged in terms of its utility as part of our ordinary lived experience rather than as a desperate cross examination for absolute truth (Banister, 1994).

Kelly also questions the inattention to the examination of what precisely has been validated and equally if a prediction turns out to be inaccurate what has been invalidated. Repertory Grid Technique is a method and not a test. It is a skilled and focused conversation and often described as an objective way of exploring someone's subjective reality. In analysing any grid material the first person to validate any interpretation is the person who completed the grid. The technique is not a test and does not have a specific content (Bannister and Fransella, 1986). Its validity can only be referred to in the sense that we can question its capacity to reveal patterns and relationships in certain types of data.



Linked to validity is the characteristic of reliability. The empiricist would look to repeat an experiment over a period of time and obtain identical results and therefore claim the reliability of the method or alternatively, refute the method and the reliability of the data produced. For the qualitative researcher the issue of reliability is more problematic. The attraction of the qualitative method is in its ability to respond to change situations and adapt within the process. Therefore the identical replication of, for example, the semi-structured interview with an owner manager of an SME would prove dubious. A judgement on the basis of reliability, in respect of repertory grid technique, should be considered sensibly into the way in which people maintain or alter their construct. The grid reliability is entwined in grid elicitation and the aim of the researcher is to behave like a mirror, allowing the interviewee to reflect upon their meaning, akin to some uses of cognitive mapping (Cossette and Audet, 1992). A qualitative intervention occurs when the researcher inputs the data and draws meaning from the resulting analysis or conducts the content analysis. Bannister and Fransella (1986) advocate estimating the value of the grid not by reliability, but by its capacity for effective enquiry into the problem at hand. Despite the level of argument to the contrary, some authors are reported by Smith and Stewart (1977) to have attempted to assess reliability of the grid by conventional methods such as test and retest. It has been suggested however that completion of a grid is change provoking in itself and that this factor alone influences the way in which subjects respond on re-administered grids, hence producing something of an unreliable indication of reliability.

The qualitative researcher has to earn the accreditation of reliability by ensuring the individual process is systematically recorded. Leininger (1994) comments on the

continued use of quantitative criteria in the qualitative paradigm and would prefer to see researchers examine their work in terms of credibility, confirmability, meaning-in-context, recurrent patterning and saturation replacing validity, reliability, representativeness and generalisability.

Representativeness describes a characteristic about a sample population and then statistically seeks confidence in applying this to a wider population. It is argued that if a selected sample is not representative then any resulting research is so idiosyncratic that it has little value in enabling any generalisation to a wider population. The greater the number of subjects the more capable the researcher feels in making claims for the whole population. However, the greater the sample size the less able the researcher is at respecting the idiosyncratic meanings supplied by the participants. This leads to the question as to what the findings of the research actually represent. The case may well have failed to fully represent a small high technology professional firm or a small firm of management consultants but it has been clear on what context was used for this study and it is suggested that aspects of what was found will be pertinent to other contexts.

Rose's (1991) analysis of the case study approach disputes the need for representativeness in the sense of the quantitative paradigm. Although in multiple case studies there is still a need to justify what each case represents in terms of its relevance to the research question (Yin, 1994). A case was selected that represents a small firm operating under severe constraints in a highly competitive area. The unit of analysis of the case, that is, group of management and employees was seen to represent various factions throughout the organisation. In qualitative exploratory research it is not always



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feasible to apply a law of representation, as the researcher is unsure of the population as a whole. Academic research involving small firms suffers from a brief history and lack of definition. Knowing what it is that is being represented a system must already have some knowledge of the object represented. The research methodology declared what was known of the case and where it was seen to fit in relation to small firm literature.

The final and some would say the most valuable contribution of research is the ability to generalise from findings. A study needs to indicate an external validity, that is, the extent to which the results of a study can be applied to circumstances outside this specific research setting. Denscombe (1998) provides a note on the potential for generalisability of a number of research methods. For example, action research is considered particularly ideographic whereas quantitative survey work offers best practice guidelines for generalisability. Bryman (1989) describes the preoccupation with generalisability as linked to the natural sciences. The intention of research is still seen as the discovery of laws that can be applied in an authoritative fashion. The ability to generalise differs between the paradigms that are adopted, for example, Yin (1994) and Hammersley (1992) from the qualitative stance, have upheld a form of generality that aims to link case study research and ethnography to theoretical inference.

...case studies, like experiments, are generalizable, to theoretical propositions and not to populations or universes.

Yin, 1994, p.10

Hammersley appears less comfortable with the use of theoretical inference as in modern ethnography the view of the world does not sit well with sociological theoretical law, preferring a constant creative evolution of mankind. Hammersley (1992) also

incorporates empirical generalisability but adds that the whole population needs close definition and contextualising.

Slowly, the qualitative postulate which offers only 'tentative explanations for one time and place' (Maykut and Morehouse, 1994, p.12) has been recognised for the depth and insight of newly discovered propositions regardless of the lack of generalisability.

A question was posed by this research process: what was considered adequate in the qualitative paradigm which complemented the notion of alternative constructivism? Hammersley has devised a framework within which the adequacy of research can be upheld. This framework draws upon the issues of plausibility, credibility, centrality of the claim and finally the type of claim. Thus this study focused on outcomes by questioning their plausibility, that is, given all the variables of this situation were outcomes reasonable. The choice of method aimed to uphold honesty and develop a trusting relationship. Elements, pilot study and case were viewed as concentrating on the aims of the research. The type of claim was realistic in its limitations.

In conclusion it is worth repeating the earlier statement that any research process needs to encapsulate the issues of validity, reliability, representativeness and generalisability *in some form or other*. It is the clarification and explanation for the use of a method in relation to these characteristics that is an essential component of good research.



### *Summary of Research Methodology*

This research aimed to inform management processes by investigating a deconstruction of knowledge in a small firm. This chapter has clarified the method adopted and the reasons behind the choice of method. A pilot study provided a valuable contribution by testing the utility and function of research method and a detailed study involving twenty participants generated constructs of knowledge in the context of a small firm.

The Faculty Human Research Ethics officer approved the research design and concerns regarding physical and psychological risks to participants were evaluated. PCT elicitation may delve into people's beliefs and views of themselves therefore the skills of the researcher were secured in order to preclude tension, stress or discomfort for all participants. The research process did not proceed until supervisors were satisfied with the level of competence of the researcher in using PCT. The pilot study ensured that data collected using the planned method responded to the aims of the enquiry and thorough training and practise in repertory grid technique ensured the research instrument would be used with care and proficiency.

An objective of this study was to examine constructs of knowledge in the context of a small firm. This objective has been met by the careful identification of a suitable sustainable press components manufacturer with less than fifty employees. A second objective called for an inclusive study involving more than just key employees and management. The management in the selected firm permitted interviews with a

representative range of twenty individuals from apprentice engineer to book keeper. There was a need to view knowledge from the perspective of, for example, toolmakers, press operators or administrators using their language structured by their construing hierarchical system. It was intended in a phenomenological sense, as a commitment to the actor's perspective (Bryman, 1988). Although this may have lead to a situation where output extracted would not fit precisely with academic models and frames of knowledge. The language and phrasing will differ from that of academics but it remains important to tease out the sense of expressions and analyse them in comparison with existing knowledge theory.

Participants could be grouped into functional divisions and seen as a complete social mix responding to the objective of gathering a personal and social perspective. The social construction of knowledge is further highlighted by the opportunity to investigate ways of knowing across communities within a small firm. The final objective of this study focuses on the impact of artifacts in knowledge construction. The method called for repertory grid interviews in relation to knowledge and artifacts that would provide two differing data sets. One outcome being the identification of artifacts by participants and the other would indicate their meaning and utility in knowledge construction.

The choice of methodology has three elements with which it must harmonise, the researcher, the participants in the research and the research topic. The researcher's own paradigm supported an alternative constructivist philosophy believing it lead to a tolerance of others in the pursuit of knowledge. It intended to create an empathy with the participants and reach out to all individuals regardless of position in the firm, age,



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background, culture, sex etc. The participant's views are explored in such a manner that they too were given the opportunity to explore their meaning. The theme of knowledge is an extremely complex area in, which to converse and repertory grid technique has provided a method to enter discourse without a preconceived academic language flooding the expressions of the participants.

Summarising the philosophy of alternative constructivism it is possible to think in terms of freedom of choice. A person can apply any number of meanings or constructs to the events they have experienced in the past. The constructs that are formed are not fixed, stubborn or cast in stone. They are patterns or templates that we try on for size and retain if they prove useful in our predictions. The world and 'man' are involved in a constant process of change thus continually testing the utility of our constructs. In the event of constructs remaining fixed we would all be victims of our past but Kelly preferred to think that fortunately we are only limited by our imaginations.

The richness PCT offered this methodology was its acknowledgement of change and the loosening and tightening of constructs to create enriched or redefined constructs. As a research methodology RGT enabled participants to interact and explore meaning revealed by the elicited constructs. The constructs have not been adjusted to fit a business researcher's questionnaire. The researcher did not manoeuvre the interview to fit with the pre-selected 'appropriate' choice of language. RGT was seen as a choice tool to research the small enterprise for its liberality of the participant's reality and depth that is uncovered which produced a closer inquiry that benefited all who participated.

The researcher supported the view that we behave as a scientist in constantly seeking to consolidate, revise or dispel aspects of our world. The emphasis here is also on our world, it is a world where we are involved in its making. A world that is not out there in the positivist sense, waiting to be discovered but a dynamic world that is construed both socially and personally, waiting to be formed.

A knowledge of Kelly (1955) suggested repertory grid technique, which provides an elicitation of constructs that places a researcher in the shoes of another. This chapter has revealed an update to the original RGT analysis methods for example, internet enabled software and combining constructs through content analysis.

An account of the case for one case contributes to the chapter section 'Rational and implications of the study'. In aiming to investigate how small firm employees know what they know it was concluded that an in-depth study of a group of employees working in one firm would provide a full and original account. The decision to use one firm was made after considerable reflection on the advantages and disadvantages of such a method.

Finally, this methodology chapter has summarised the critical research method issues. A form of validity, reliability, representativeness and generalisability are all accounted for and supported by the method employed.



## CHAPTER FOUR

### FINDINGS

#### Introduction to findings

Findings in response to the research question are presented in six sections. The reader is drawn into the complexities of knowledge construction even in a small firm of thirty two employees, twenty of whom participated in the research during 2001. The first section is an analysis of the elements derived from the individual conversations; elements concerning knowledge and people (Part A), which were identities for prescribed role titles and elements that were volunteered by the participants as representing knowledge artifacts (Part B). Following the analysis of elements the second section of the findings move to report twenty cameos illustrating the individuality of participants. The cameos were revealing in their candid approach, highlighting the disabling and constraining factors on knowledge warranting mechanisms. The same participants later formed the collectively socially constructed meaning of knowledge in this small firm..

A third section examines the data for what was found in relation to links between Part A knowledge and people with Part B knowledge and artifacts.

A fourth section in this chapter provides a content analysis of the total constructs elicited in respect of, knowledge and people and knowledge and artifacts. That is, all constructs

from all participants in the context of knowledge and people were gathered and examined for common themes. The process is then repeated with all constructs derived from all participants in the context of knowledge and artifacts.

In seeking the eulogised form of knowledge the analysis includes a fifth section with an account of the collective constructs that defined the element “*when I say knowledge the first person you think of*” renamed the knowledge icon.

The final section of this chapter reflects an original use of the sociogrid software (Shaw, 1980) exposing the commonality and sociality (Kelly, 1955) of the constructs involving all participants. This thesis recognises that a small firm consists of hierarchical work groups and informal communities. The findings reflect the construction of knowledge amongst these different social associations. Socionets illustrate the network of construing knowledge present at the time of the research.

Summary of findings content:

- Section 1 Analysis of element selection
- Section 2 Cameos analysis and narrative feedback using Web Grid III
- Section 3 People and artifact links
- Section 4 Content analysis
- Section 5 The knowledge icon
- Section 6 Socionet - Group Constructions using Sociogrid (Shaw, 1980)



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## Section 1 Elements

### Part A: Knowledge and people

This section provides an analysis of the Part A Elements 1 – 10 detailed below, selected for this study. The choice of elements was a critical factor to the success of the repertory grid technique and their use and their effect are worthy of further explanation. Repertory grid elements must be representative of the pool from which they are drawn (Fransella and Bannister, 1977). In this study, the technique was used to examine the meaning of knowledge in relation to an individual in his/her world including work environment and in Part B in relation to representations (artifacts) of knowledge. The elements needed to sufficiently represent the population of people with whom the individual associated at work and in addition the population of representations to which the individual may have been exposed.

In Part A of the repertory grid conversations the element role titles were provided for the twenty participants to attach their personal label. The elements role titles for Part A were as follows:

Element 1 When I say knowledge the first person you think of

Element 2 A person who conducted any part of your formal training

Element 3 An immediate colleague

Element 4 Another employee within the firm

Element 5 A key informant external the firm

Element 6 Another key informant external the firm

Element 7 An individual from your home/social life

Element 8 The owner manager

Element 9 Me

Element 10 Me as I would like to be

Elements must be within the range of convenience of the constructs to be used (Fransella and Bannister, 1977). The pilot study and main study revealed that the elements produced constructs were largely applicable to all the elements. Thus, as an example, it was possible for all the elements, in Part A, to be rated on the basis of a construct *educated* or *lacking in education*. Whereas a construct elicited from the Part B elements; all linked to knowledge representations, would not apply to the Part A elements, for example *got to read it or communicates visually*. The pilot study confirmed that the elements were within the range of convenience of the constructs to be used.

It was clear from Part A element role titles that anonymity of some elements was not possible. In other cases the precise label used by the participant would have no meaning for the researcher. In order to gain trust and maintain confidentiality, it was important that the final analysis of the constructs related back to the role titles and the participant was assured that the precise element label personally utilised was not recorded.

There were three elements that were considered more challenging and intimate. Part A included the element ‘an individual from your home/social life’ as a comparative to the working relationships. This invariably was the person’s wife/husband/partner. Part A also included ‘Me’ and ‘Me as I would like to be’ as the person’s view of themselves was revealed to the participant and to the research. It provided an opportunity for the individual to think about their view of knowledge and analyse whether this state was



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where they wished to remain. These three elements were perhaps the most uncomfortable for the researcher to pursue but invariably prompted a deeper perspective for the participant. Neither the pilot study nor the prime case provided instances of a non-response to these three elements. This indicated participant's trust in the research activity.

The pilot study and the prime case gave rise to the following comments on the other Part A elements but are not considered a vital element of the findings but were observations that enhance our understanding.

The label attached to all the role titles remained anonymous and certain features were of interest. The participants labelling of the element role titles always began with, '*When I say knowledge the first person you think of*'. The choice of individual for this element ranged from my mother to Einstein but it was never an employee or manager of the firm. The use of a prominent individual was by far the most popular option, Einstein, Leonardo Da Vinci, Sir Isaac Newton and so on. The participants thought of knowledge and thought of a historic mathematician, inventor or scientist. They were not always correct in their descriptions of what this person had done but the name related to knowledge. Shaw (1980) recommends the element role title label is a person or thing that is well known to the individual and personally meaningful. The label given to *When I say knowledge the first person you think of*, was often a prominent but historic character therefore it was impossible for the participant to have known the prominent person well. However, the participants all appeared quite comfortable in outlining their

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presumptions as to how they perceived the prominent person would be rated on the completion of their repertory grids.

Commenting on the completion of the grid was often accompanied by phrases such as,

“Well I don’t really know if the person was X but this is how I think they would have been – it’s how I see their knowledge”

In repertory grid conversations the researcher is interested in stepping into the shoes of their participant and therefore it remains unimportant as to whether a prominent person *should* be construed as X. All that remained important was how the participant saw the prominent person.

Element 2. A person who conducted any part of your formal training did not create any difficulties for any of the participants. All either referred to a teacher or work instructor.

Elements 3 and 4 were work colleagues and as all participants worked alongside others it was a simple labelling process. However, Elements 5 and 6 (key informants) required some explanation from the researcher. Firstly, in response to what was meant by ‘key informant’ and then discussing whether the participant actually had any key informants. On two occasions this descriptor had to be stretched to incorporate an informant from outside the factory location but still employed by the company. The participants had no contact at all with individuals from outside the firm with regard to their task or responsibilities.

Finally, Element 8 ‘owner manager’ was identified correctly in the pilot study as the owner of the firm. Occasionally, in the prime case it was found that the owner manager



was confused with the managing director. In this particular company it was easy to appreciate why the confusion would arise for the employees. The background to the case has explained that the true owners of the firm were rarely seen in the Company and had little contact at all even with the Board of Directors. It was a totally ‘hands-off’ investment. It was also clear that the Managing Director of the Company had very little involvement with the shop floor staff and restricted his line of communication to his two co-directors.

**Part B: Knowledge and representations**

As in Part A the selection of elements was guided by the advice of Fransella and Bannister (1977). Once again the elements needed to be within the range of convenience of the constructs to be used and representative of the pool from which they were drawn. In Part B the twenty participants volunteered a minimum of six items they perceived as assisting in their acquisition of knowledge. Helping them to know what they know. From the original twenty participants, sixteen completed the Part B repertory grid and four participants did not proceed. The reason four of the original twenty failed to complete a Part B grid was due to time restraints (two participants), one participant had found the Part A process too exhausting and one participant did not wish to proceed. Table 3 below indicates the items selected by the continuing sixteen participants, the frequency of the selection and the job identity of those who made the selection.

Table 3. Items volunteered as element in the context of knowledge acquisition

Item	Frequency	Job identity
Computer	12	2 x press operator 2 x tool setter setter operator apprentice tool maker quality engineer office admin. despatch and goods in book keeper Tech. And Commercial Director
Television	9	4 x press operator 2 x tool setter setter operator apprentice Works Director
Works Manual	7	3 x press operator tool maker quality engineer book keeper Works Director
Newspapers	7	3 x press operator 2 x tool setter setter operator apprentice
Telephone	6	2 x press operator setter operator quality engineer shop supervisor Works Director
Books (technical)	4	2 x tool setter apprentice press operator
Drawings and Specification Sheets	4	2 x tool setter tool maker apprentice
Instruction Sheets	4	2 x press operator despatch and goods-in quality engineer
Notice Board	4	2 x press operator office admin. book keeper
Training Videos	4	Press operator Apprentice Quality engineer Shop supervisor
General correspondence	3	Office admin. Book keeper Tech. And Commercial director
Internet	3	Tool maker Tech. And Commercial Director Works Director
Company documents	2	2 x tool setter



Job Sheets	2	Press operator Book keeper
Machinery Manuals	2	Shop supervisor Quality engineer
Memorandums	2	Office admin. Tech. And commercial director
Reference Books	2	Tool maker Tech. And Commercial Director
Trade magazines	2	Works Director Tech. And Commercial Director
Company Records	1	Shop supervisor
Case Company Handbook	1	Office admin.
Despatch Book	1	Despatch and goods in
E mail	1	Tech. and Commercial director
Fax machine	1	Shop supervisor
Files	1	Office admin
Goods inwards Files	1	Despatch and goods in
Leaflets	1	Despatch and goods in
Library (municipal)	1	Tool maker
Machines	1	Setter operator
PC Database	1	Works Director
Personal diary	1	Shop supervisor
Purchase order book	1	Book keeper
Quality manual	1	Despatch and Goods in
Radio	1	Press operator
Samples	1	Press operator
Trace card	1	Press operator
Works orders	1	Setter operator

Sixteen participants offered thirty-six different elements in the context of assisting personally in the transfer of knowledge. A frequency count of the elements was a useful insight for management but due to the small numbers a statistical analysis would have carried little relevance. Some particular points are worth noting and add to the depth of the inquiry.

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Twelve of the sixteen participants offered the computer as an element. The precise nature of the relationship with the computer varied as it was seen to have a number of uses. Some of the participants chose to select the computer as one element and quite separately, PC database, Internet and E-mail. The latter are all functions of the computer but were identified as autonomous and warranting individual elements.

A television was accessible to all the participants, at home and occasionally at work. The participants reflected on the value of the television in making them aware of their industry and current affairs. Interestingly, only one participant mentioned the radio and yet BBC Radio One was frequently playing at high volume on the shop floor of the factory.

Copies of the Works Manual were available from various locations throughout the firm and all staff had been asked to read this item during initiation. The canteen/rest area possessed a copy of the Works Manual together with a selection of tabloid press. Seven of the participants offered 'newspapers' as an element. The other reading material available in this location consisted of old trade magazines passed on by both Works and Technical and Commercial Directors. Yet only two individuals mentioned trade magazines - the two directors. The canteen/rest area was also the location of the 'Notice Board' offered as an element by four of the employees. The researcher noted that the Notice Board was well presented with current information and a mix of trade/company and personnel issues.



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The telephone was seen as a means of assisting in the transfer of knowledge. The use of the telephone was severely restricted due to the number of telephones in the building, access and the extremely loud noise level that constrained any use of the telephone in the manufacturing areas. It is arguable whether the telephone should have been permitted as a representation of knowledge as it really performs a transmitting exercise. However, here the researcher is not focusing on the telephone messages but on the physical use of the telephone.

Four of the shop floor employees referred to the technical books that they used on occasion. However, the practicality of using any reading material was limited due to the proportion of employees in the company with literacy difficulties. The researcher was unprepared for such poor literacy and found it essential to alter the method to suit the individual dependant on their reading ability. The affected employees were quite open about their illiteracy and fortunately did not appear humiliated by the research process. The joke amongst the shop floor employees appeared to be *“that X was the fortunate chap because he had been taught to read at Her Majesties Pleasure!”*

The company had a well-scheduled and concise training process and training videos were used with all the staff on a regular basis yet only four of the employees mentioned videos. The impact of Internet and E-mail had minimal effect on the functioning of the Company. Both directors were familiar with the Internet and had assisted an enterprising toolmaker in the design of the Company’s web site. The E-mail communication was only used regularly by the Technical and Commercial Director.

The further eighteen elements were suggested only once by participants which suggested variety and diverse patterns of work and behaviour. The individual elements varied from the machines themselves to a personal diary to the quality manual. A setter operator had revealed in strictest confidence that his knowledge was enhanced by placing a hand on the press machine as it functioned. This practise was totally contrary to Health and Safety regulations recommended in the use of such equipment. The participant explained that his hands were able to feel the vibrations and he could then assess whether the press was set correctly.

The shop supervisor kept a hand-written personal diary of each day's activities, findings and reflections. The man had worked in the company for many years and kept all the previous years diaries. The shop supervisor was notably proud of his record keeping and referred to the diary as an 'invaluable tool'. He had no idea whether other individuals in the firm were aware of his diaries.

As a final note on the choice of elements in Part B the Company publicity material states in broad headlines a total commitment to quality of service. It is registered to BS 5750/ISO 9002 and

...trained operators continually audit and monitor the quality of their own work, supported by planned patrol audits and regular systems audits.

Yet ironically only the despatch and goods-in participant suggested the Quality manual as a knowledge facilitator.



Such variation in the selection of elements provided an insight into the heterogeneous mix of individuals employed by this small firm. There is not a single element common to all the employee participants. The greatest level of commonality is seen with the computer, television, works manual and newspapers. The computer usage was relatively new to the company and had placed considerable demands on some individuals. Scribner's (1991) study of changes in a manufacturing firm following the installation of computer numerical control (CNC) machinery also found that the machinery demanded new ways of thinking that affected processes and work behaviour beyond the direct relationship with the new artifacts. The remaining elements were common to only a minor proportion of the employees and eighteen of the elements are autonomous and personal to various participants.

Selection of Part B elements related to job activities, individual's background and the work place environment. The same research tool used in a high-tech office would produce quite different elements with probably a stronger emphasis on telephone and technology. The case company was a producer and supplier of pressed metal components. The presence and noise of the press machines dominated the workplace. The employees were largely unskilled or moderately educated. It provided a context for the constructs that were derived from this broad spectrum of elements. The researcher explored the constructs that were derived from the elements. In some instances it was possible to examine constructs with like elements but in many instances the constructs 'unattached' to specific elements were viewed for their value in creating meaning. It is vital that the analysis constantly refers back to the context outlined with each participant,

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that is, the constructs that are elicited in the context of '*assisting personally in how you know what you know*'.

## Section 2 Case Company Cameos

### Introduction

This research endeavoured to capture how employees know what they know in the context of a small firm. In a small firm with consequently few employees there was evidently individual perspectives and personal meaning. The following twenty cameos' contain rich description of the various incidents that transpired during the time the researcher spent with the firm. The cameos also contain specific detail on the participants that either sets them apart from their colleagues or unifies them. Subsequent sections draw out common themes and reduce the constructs to specific categories.

In this section the opportunity arises to focus on each individual and their unique set of constructs. The point of this particularity is not to decry the generalized collective as seen in the content analysis. It is to provide a detailed and valuable appendage to the collective that adheres to the foundations of construct theory. By putting the constructs back in their original individual positions allows the reader to appreciate that participant A may live by construct X (apparently the same as participant B) but they also incorporate the construct Y that does not inhabit the constructed world of participant B. These individual sets of constructs enable us to understand the participant's construing system and thus potentially anticipate the reaction to alternative events. The emergence



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of such novelty in the individual construing should be applauded (Tsoukas and Vladimirou, 2001).

As an example ‘knowledge and people’ for one participant incorporated the construct ‘not recognized – knowledge is shown by their success’ and reinforcing this ‘experienced less – because of position more wiser’. For this individual one could anticipate that the transfer of knowledge from a senior member of staff would be productive. The same participant may not gain considerable advantage from immediate colleague knowledge transfer. However another participant also uses a construct ‘role in life indicates knowledge – average intelligence’ but other constructs in his system appear to connect communication skills to knowledge. Therefore, this individual may accept the knowledge transfer of colleagues on condition it is well communicated.

The cameos are an eclectic mix of ingredients that require respect in any attempt to transfer knowledge to the advantage of the company. Later in this chapter, in Content Analysis Part A (knowledge and people) the category, knowledge transfer featured most strongly with values, experience, specialist, academia, intelligence and discovery forming fifty per cent of the pie chart in Figure 26. In the Content Analysis Part B (knowledge and explicit representations) seventy five per cent of the pie chart in Figure 27 absorbed just four categories, demands placed on the individual, range, inclusion/involvement and validity. The cameos are an aid in understanding how these specific categories arose and illustrate the variation in mix of categories that were individually construed.

The cameos not only represent different factions in the company, as explained in the methodology but can also be seen to represent different social categories. There were thirteen male and seven female participants. All of the female participants were white and only two male participants were non-white. The spread of ages was weighted towards the over forties, which was indicative of the aging workforce employed by the company.

Age	60's	50's	40's	30's	20's	teens
	4	5	5	3	2	1

All managerial staff were male and over forty. None of the participants or other employees had experienced higher education but some had attended places of further education or undergone in-house training. The most highly qualified member of staff being the managing director with a Higher National Certificate in Production and Mechanical Engineering.

Specific data in respect of their religious beliefs, income, and marital status was not collected although some participants volunteered this information. The researcher was aware that all unskilled labour was paid the national minimum wage and the total of the directors and shareholders annual incomes did not exceed £126,137 1999/2000 (source: annual audited accounts).

The reactions of the individuals to the process varied from nebulous constructs that required persistent laddering. Alternatively, a clear concise frankness that at times the researcher found offensive. When rating elements, participants did not overuse the



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middle scale in either of the two repertory grid contexts. The important issue for the researcher was to get a mental map of how the participant viewed their world, record and discuss the map without imposing academic rhetoric. This was successfully achieved.

The theme of the repertory grid conversations was ‘knowledge’ and the researcher was conscious that this was not a regular theme for the participants to consider. The findings reported in the following cameos are deeply rewarding. People from a set of diverse backgrounds contributed to the notion of knowledge warranting and assisted in the compilation of themes seen in the content analysis.

Complete or extracts from the Principal Components Map and Focus Clustering for both knowledge and people and knowledge artifacts are included throughout the findings. All data collected from participants was analysed using the same software and resulted in the same output format. Extracts from the diagrams are incorporated throughout this section to highlight specific issues.

### **Summary of Case Company Scene**

Prior to field activity, knowledge of the case company was limited by desk research and telephone contact with managing director and works director. Desk research revealed the company’s financial situation and their web site provided a background to products and expertise. An internet based search disclosed other institutions both academic and sector

specific that had involved this company. A more accurate picture of the company was gathered once face-to-face interviews began.

The company was based on a post World War Two industrial site surrounded by social housing on the outskirts of Birmingham. The company occupied a purpose built industrial unit with mezzanine housing reception, offices, canteen and rest areas. The unmanned reception area displayed various items of certification and promotional material. The shop floor was divided into the main press cutting area with quality and development workspaces. This area was extremely noisy due to the workings of substantial press cutting machinery, ear protection was prescribed essential (but not always worn). With the exception of female administrators all employees (including directors) wore a T shirt inscribed with a company logo plus prescribed work wear. Manufacturing commenced at 8.00 a.m., five days a week and finished at 4.30 p.m. except Fridays when all employees finished at 1 p.m. Lunch was staggered in half an hour breaks.



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## Participant One

### Knowledge and people

This late 50s male Board Director was particularly enthusiastic about the research. The repertory grid process had been demonstrated to this participant at an earlier meeting therefore the participant appeared familiar with this conversation tool. He was conscious that the employee's attitudes to knowledge differed and that it would not be realistic to force the employees to share what they know without first appreciating their individual grounds for knowledge. He was also interested to learn of the employees various thoughts on knowledge in order to evaluate what would be a more efficient company knowledge management process. Therefore the participant had a definite concern for the outcome of the conversations with others with less focus on his own constructs. The complete rated grid, components map and focus diagram can be found in Appendix V in respect of knowledge and people. The participant examined the original hand-written grids and made a number of personal observations.

He was particularly content with constructs he had generated and only interested in changing the direction of one. He was not an apprentice-trained engineer although part of him would have liked to have been. He could see that his view of people's knowledge was closely related to how he related to the person socially. There were certain individual's in the company whose company he enjoyed and he would listen to them and share his knowledge. Yet, other individual's he was *supposed* to gain knowledge from but due to his personal feelings towards them he found this difficult.

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The participant held considerable respect for anyone that invested time and resources into setting up a business, indicated by the ratings of the owner manager element. This business acumen was seen as academically biased. The participant determined that owning a sustainable business was a sign of a good broad knowledge.

The Principal Components map was divided by the vertically displayed construct 'trained in a specific field – knowledgeable in other areas' and the horizontal axis 'not academic background but knowledge through experience – knowledge of business (academic)'. The references to a specific field of knowledge were apparent throughout the conversation. The Works Director relied on the engineering knowledge of a few close colleagues to assist him in areas that he felt he should have known. This is perhaps as a consequence of the participant not personally undergoing any formal engineering apprenticeship. The participant had to trust and respect these key informants in order to seek their knowledge and rely upon it.

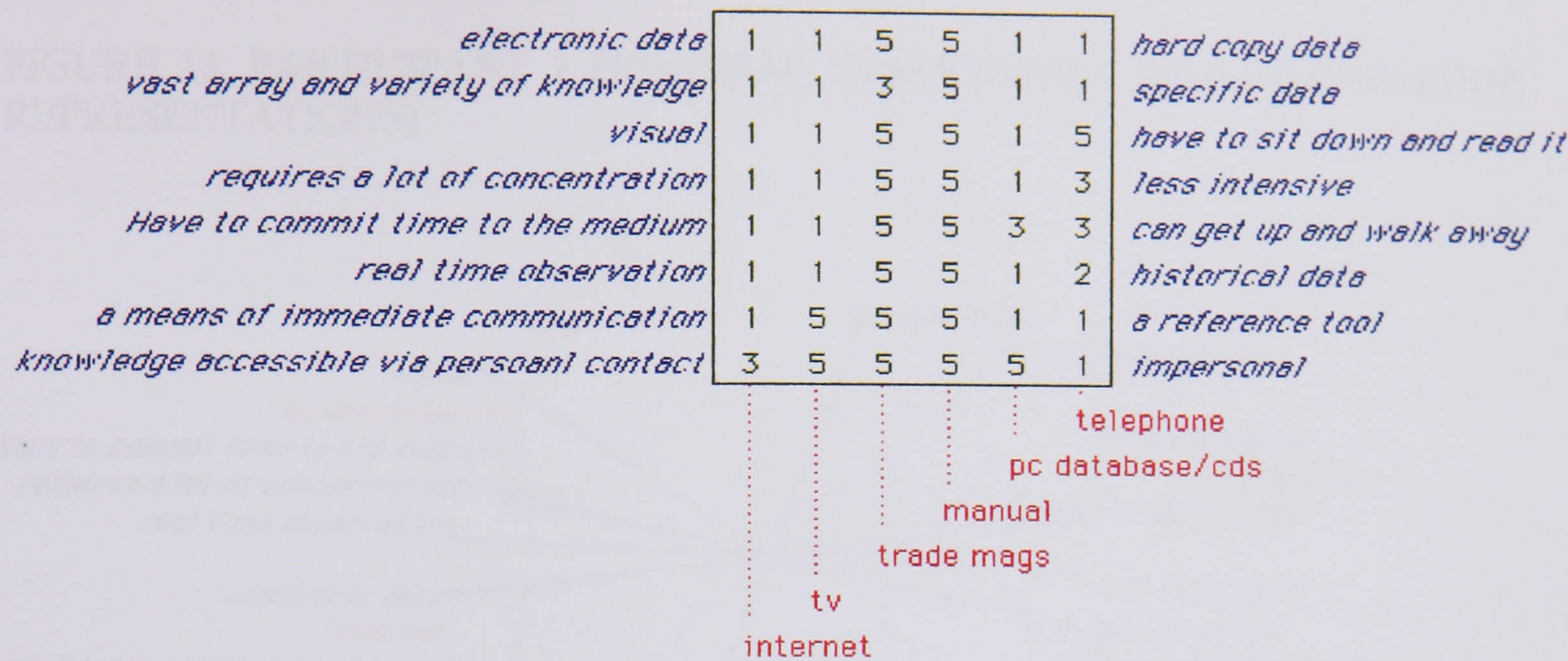
The Cluster Analysis supports this further with the high correlation between the constructs containing trust/respect and responsive in providing knowledge. The close knit relationship between two colleagues can also be seen in the cluster analysis.

### **Knowledge representations**

Note the knowledge representations were volunteered, by the participant, as the elements for construal rather than in the previous section where they were provided. The elements provided are indicated by the display diagram in Figure 12.



FIGURE 12. Participant 1 Resulting Ratings Grid (knowledge representations)



The elements included items the participant had everyday contact with. The participant fell into a pattern of describing the items in terms of his physical engagement rather than thinking selectively in terms of the context of knowledge. However, the principal components map in Figure 13 displayed a subdivision of the constructs that could be summarized as one pole being, impersonal, specific and historic as compared to the personal, immediacy and timeliness of the contrasted pole.

The Focus Cluster diagram (See Figure 14) further illustrates the particular constructs that represented hard copy data (trade magazines, works manual) and electronic data. The latter was something the participant had been pressed to learn because of changes in the company. The progress of work on the shop floor was now monitored using electronic input. The customers preferred to use e-mail to communicate and the participant was responsible for arranging a website presence. Thus the constructs



incorporated the time committed to the medium and the physical drain on the participant. As a positive stance the participant enjoyed the ‘real time observation’ that the new systems allowed.

FIGURE 13. PARTICIPANT 1 PRINCIPAL COMPONENTS MAP (KNOWLEDGE REPRESENTATIONS)

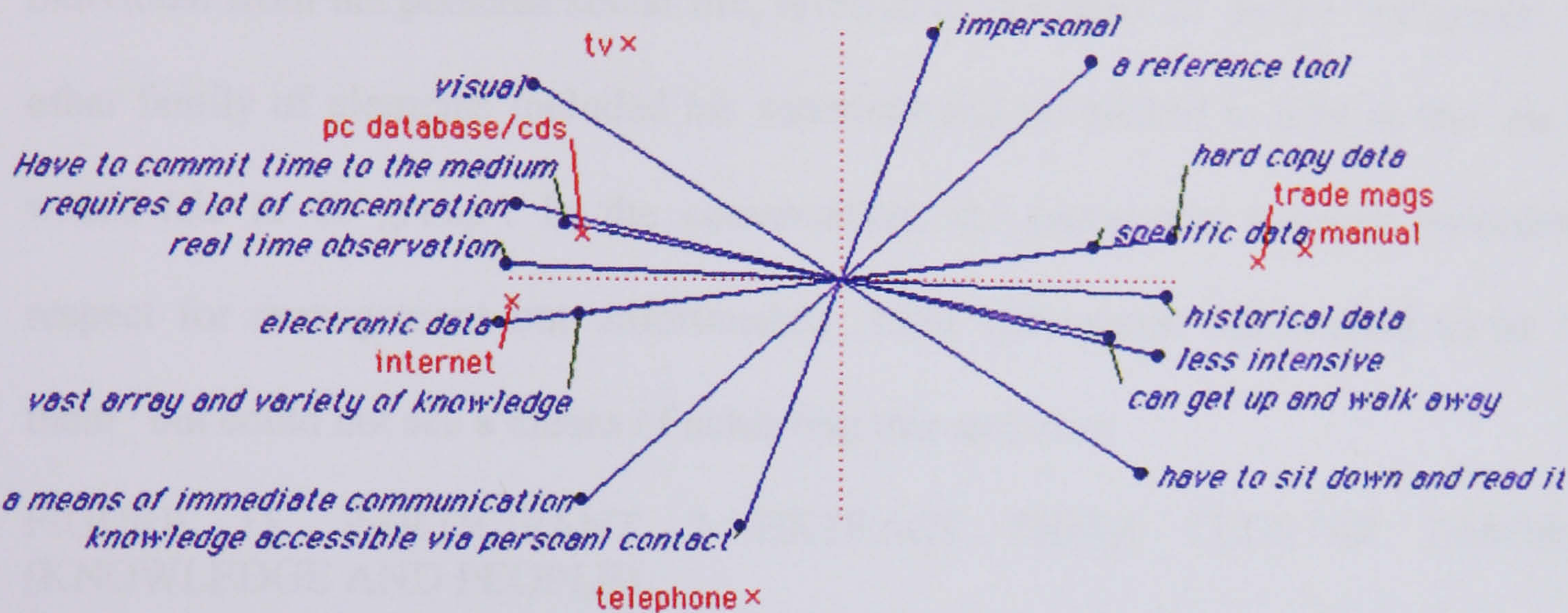
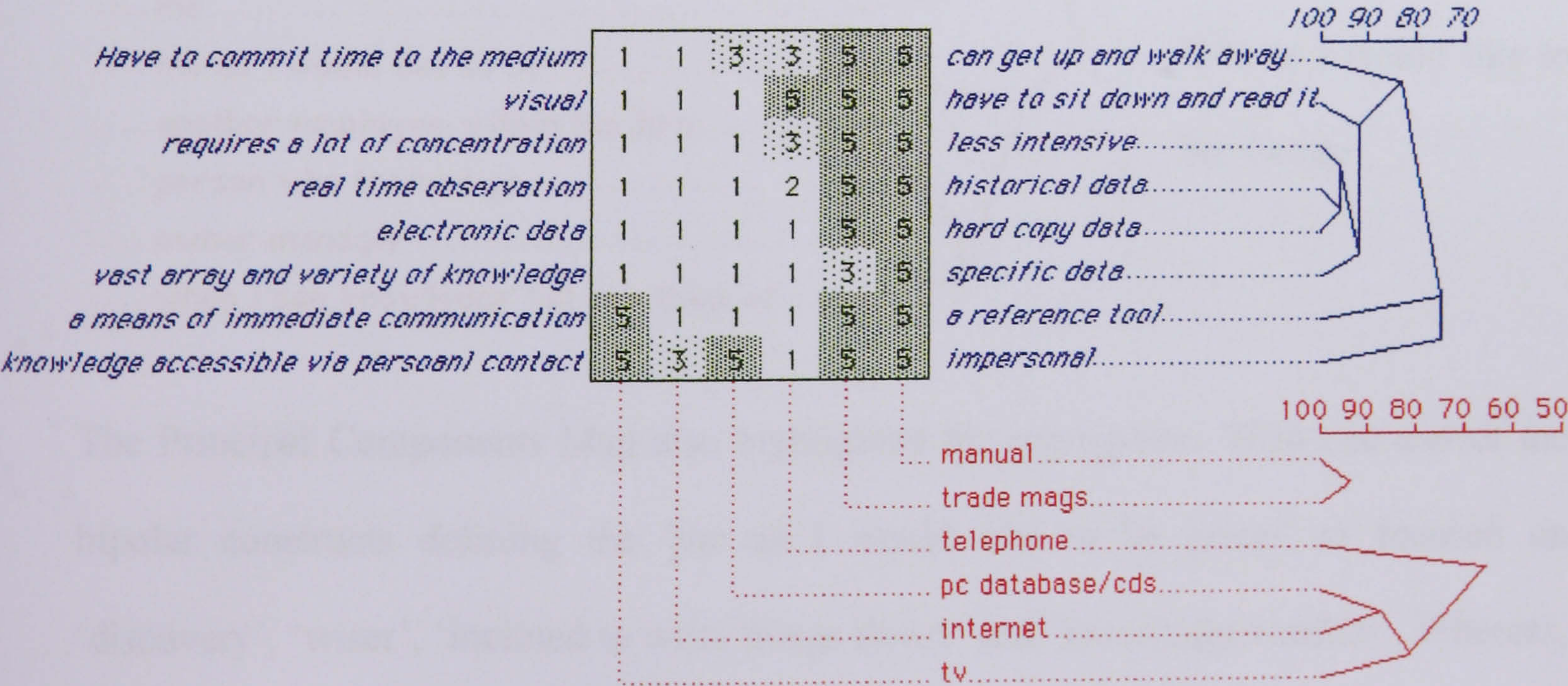


FIGURE 14. PARTICIPANT 1 FOCUS CLUSTERING (KNOWLEDGE REPRESENTATIONS)



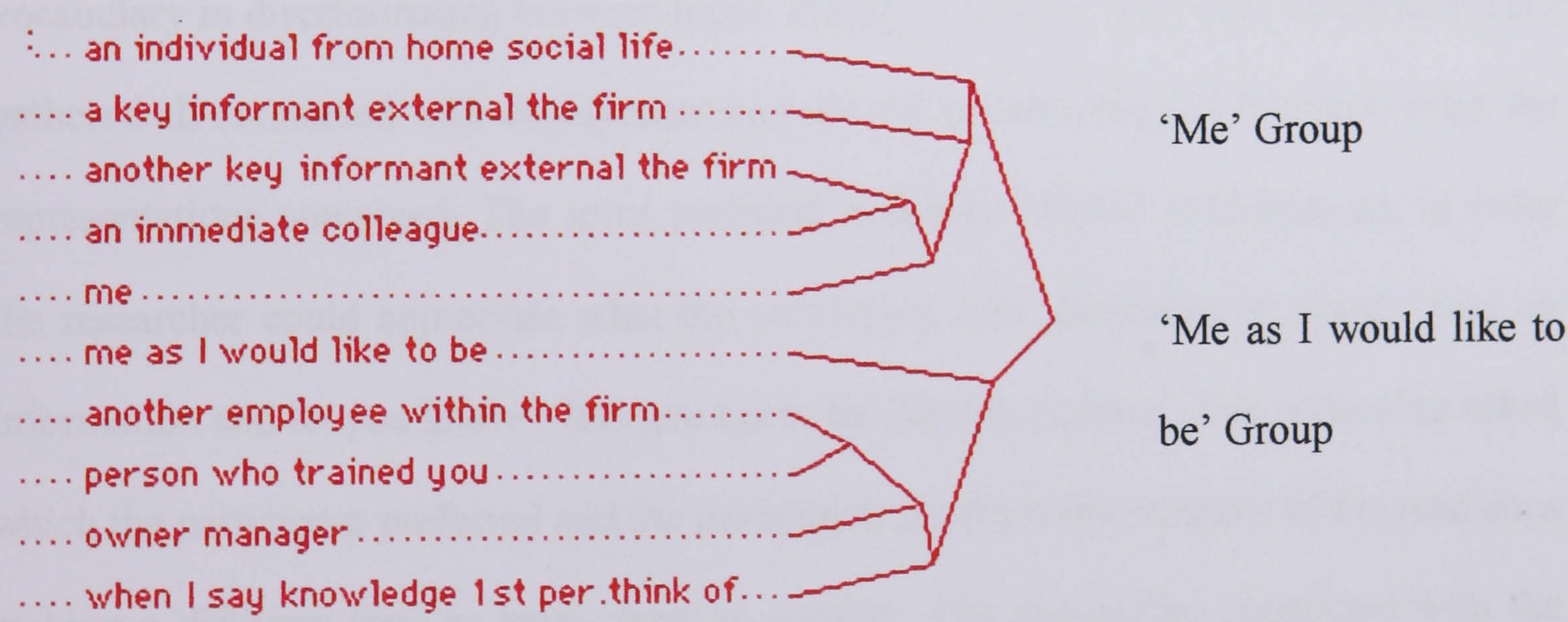


Participant Two

Knowledge and people

This white, mid –twenties, male worked as a setter operator. The Web Grid III Cluster diagram revealed two families or groups that distinguished between elements. The participant saw himself within a group alongside a colleague, his key informants and the individual from his personal/social life, referred to in Figure 15. as the ‘*me group*’. The other family of elements included his superiors and is referred to here as the ‘*me as I would like to be group*’. In the conversation, the participant revealed considerable respect for management but unfortunately, little self-esteem. He wanted to be “like them” but could not see a means of achieving this ambition.

FIGURE 15. PARTICIPANT 2 EXTRACT FROM CLUSTER DIAGRAM (KNOWLEDGE AND PEOPLE)



The Principal Components Map also highlighted the segregation. With one end of the bipolar constructs defining the ‘me as I would like to be group’ as focused on ‘discovery’, ‘wiser’, ‘inclined to write things down’ and ‘knowledge transfer’. Whereas, the ‘me group’ centred on, ‘still learning’, ‘all upstairs and not on paper’ and perhaps most relevant ‘only take in what they want to know’. This last comment was discussed



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in more depth and the participant was clear that people either choose to absorb knowledge through their daily experience of life or through books. What they choose, cannot be prodded or prompted by management, government or other interventions. According to the participant only the knowledge that the individual personally selects will be stored, added to and utilised.

The participant emphasised that knowledge is above all what is gained from reading books.

### **Knowledge representations**

The participant struggled with the construct elicitation in connection with knowledge representations. He volunteered elements without difficulty but was then limited in his vocabulary in discriminating between them. Finally, a total of only three constructs were gathered all connected with engagement and not the epistemology of the knowledge the representations contained. The most pertinent construct needed laddering up, in order the researcher could appreciate what the participant was attempting to share, ‘pass on information and let you know – lets you know but hard to explain’. The researcher asked which the participant preferred and the participant provided the example of the machines making a different tone as being *hard to explain*. The knowledge connected with the machine tones is not in any manual or machine guide because words could not really describe the different tones. It was only the practice of standing with the machines over a lengthy period, in different contexts (humidity, temperature, and materials) that enabled the participant to know what action to take.



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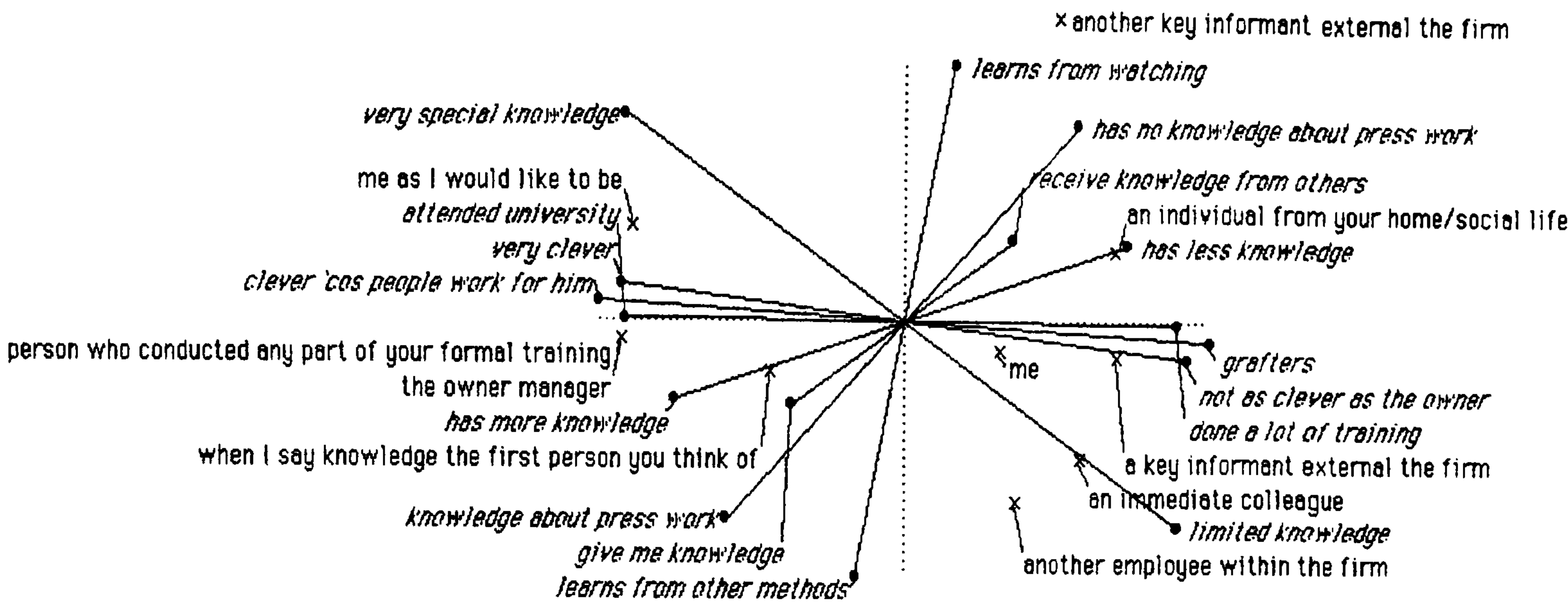
The participant also discriminated between elements based on whether they involved reading. He admitted that he would always prefer to be told something than have to read it for himself. The reading activity was troublesome because even if he read the writing he could not always comprehend what the writer intended.

### **Participant Three**

#### **Knowledge and people**

A white mid-thirties male who saw knowledge as 'being clever', 'going to university' and being in the position of having people work for you. This he saw was the complete antithesis of his own state. He had not been to university and did not have any 'special knowledge'. The construct, 'grafters – clever 'cos people work for 'im' highlighted how this individual recognised knowledge. A clever person was distinctly not a grafter, according to participant three. The clever people were in the control positions and he was being controlled. His own knowledge was gained through work-related training that the controllers deemed essential. The training just made him a better grafter. He could not see any opportunity that would enable him to be in the same position as the 'clever people' but merely a life time of the grafting state. From Figure 16. note that participant three offered constructs that were later categorized into the domain of intelligence and academia with no offering relevant to values or experience.

FIGURE 16. PARTICIPANT 3 PRINCIPAL COMPONENTS MAP (KNOWLEDGE AND PEOPLE)



The participant discriminated between providers and receivers of knowledge. The transfer process was not seen in equilibrium as a two way process.

**Knowledge representations**

This participant thought about representations in terms of their reliability. Interestingly, from the six elements only two, books and the telephone were rated as more reliable. The participant commented that everything that anyone could need to know could be found in books. He believed what was printed in a book and he also believed someone who spoke to him over the telephone. The participant added that the only people he spoke to over the telephone were family or close work colleagues further clarified this last point.

Having completed the grid with six elements the participant volunteered another element which he saw as representing knowledge. He viewed the training certificates as



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significant on two counts, as a boost to the individual's confidence and secondly as a means of recognition. The certificate was considered something to indicate that the individual held a specific piece of knowledge.

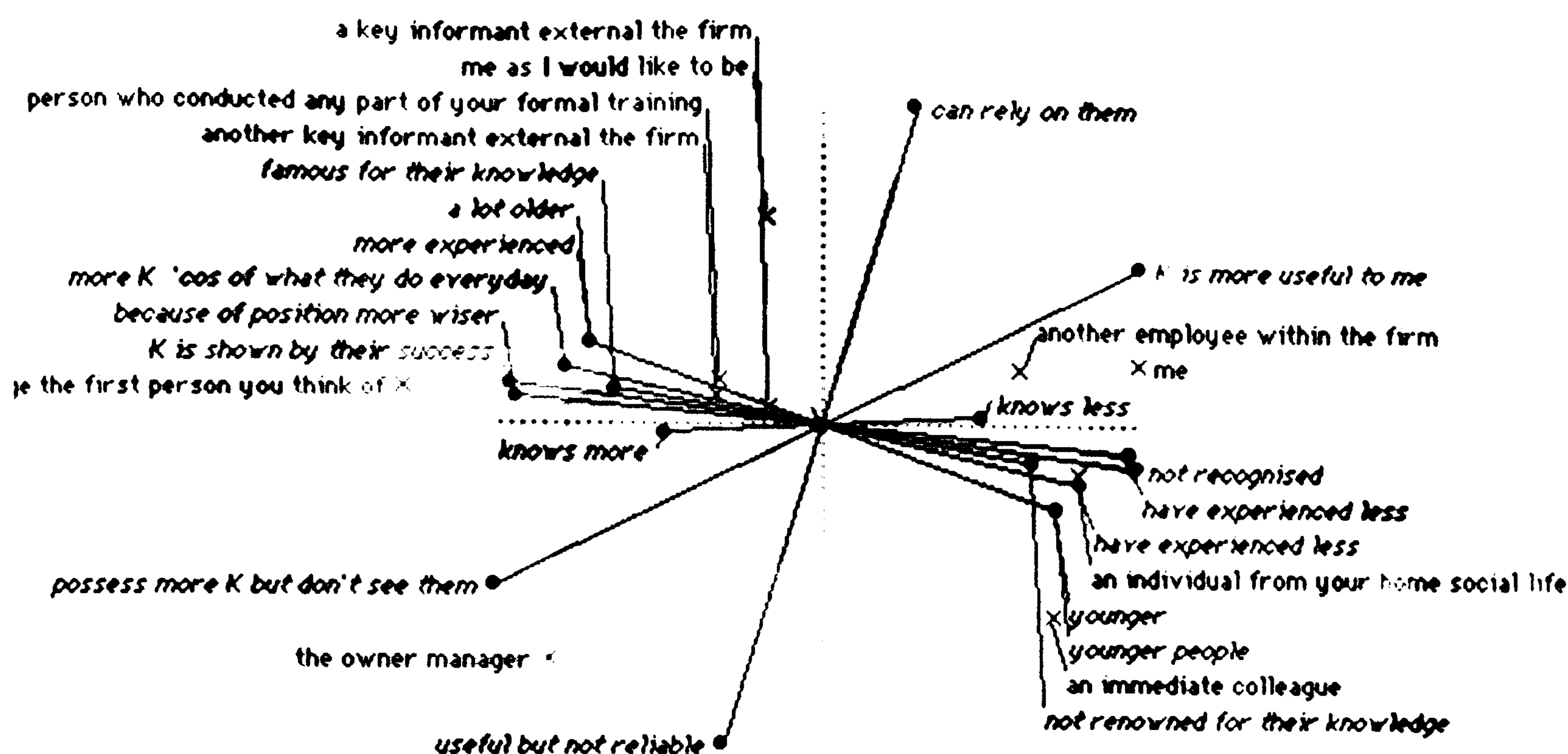
## **Participant Four**

### **Knowledge and people**

This participant was a young white male teenager who attended college and was also completing an apprenticeship scheme within the company. The Principal Components map produced by WebGrid III confirmed a clear division during the elicitation process. Knowledge, according to this participant was displayed through age, success and position. The participant found age and knowledge closely related. The constructs involving experience was repeated which indicated this was an important issue for participant four. Constructs are hierarchically organised and those that are repeated are frequently the super ordinate constructs for the participant. However, despite the apprentices academic links he did not embed knowledge in academia instead it was placed soundly with experience.

A further two relevant issues clearly seen from Figure 17 was the autonomous position of the element owner manager. Here, he was construed as knowing more but rarely accessible. Secondly, the autonomous position of the construct, 'useful but not reliable – can rely on them'. The latter indicated that this construct had very little relation to any other construct.

FIGURE 17. PARTICIPANT 4 PRINCIPAL COMPONENTS MAP (KNOWLEDGE AND PEOPLE)



### Knowledge representations

On occasion, the researcher found it difficult not to intervene whilst the participant was construing. Contradictions appeared in this participant's construction but it is important in the method to accept that the participant lived by these apparent contradictions. The participant enjoyed acquiring knowledge through reading newspapers and watching videos because he felt the language was more akin to his own. This was in spite of the newspapers and videos being construed as 'less reliable' and 'someone else's opinion'. The construct of reliability stood at the opposing end of the bi-polar construct 'more truthful'. Thus as something becomes more reliable then it increasingly moves up the continuum towards truth.



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Books were considered ‘boring’ which was to say they were not construed as ‘interesting’ and when asked for the ideal work related representation the participant offered a company newspaper.

## **Participant Five**

### **Knowledge and people**

This white male tool setter was in his mid-fifties and regretted not broadening his knowledge earlier in life. He viewed his own knowledge as thorough but limited. The constructs in Part A can be seen from the Web Grid III Focus Clustering to divide into three groups. The groups extracted from the diagram and reproduced here with headings that act as a summary of the constructions.

Looking at the arrangement of the elements in Part A on the Web Grid III Principal Components Map there were some notable points of discussion. This participant had been working closely with customers’ employees and this had made an impression. The participant recognised his preferences for knowledge being transferred personally and with considerable trust between the provider of knowledge and himself

In summary the participant considered knowledge to be principally connected to education. The more educated an individual is ‘in the first instance’ then the greater opportunity to add to that knowledge in later life. In general, he felt that people could not be bothered to expand their knowledge once they finished school. Thus in spite of knowing that further education facilities were accessible the participant refrained from

using them. He knew they would offer him the chance to broaden his knowledge and regretted the decision not to attend. He felt that life had just passed by and his social circumstances had resulted in him not pursuing new areas.

#### Group (I) – Knowledge Transfer

Unable to say whether I trust them – trust in them

Passes on knowledge via media – passes on knowledge personally

Communicate less about the work itself – communicate regularly

Knowledge is passed through other people – able to pass on knowledge first hand

#### Group (II) – Breadth of Knowledge

Has knowledge don't come across in Company – knowledge relates to my job

Knowledge is more worldly – knowledge relates to engineering trade

More knowledge about general things, a clever clogs – clever in their own way

#### Group (III) Education and Power

University – secondary modern

Will always have final say whether right or wrong – don't have the power

### **Knowledge representations**

This participant's volunteered six elements and four constructs but his enthusiasm for completing the grids began to lessen and he preferred to converse. In this instance the constructs acted as indicators, which the researcher was able to ladder, up or down in order to gain the most depth. The constructs fitted the themes of currency and engagement but the conversation led to further insight.

The participant saw knowledge as being enabled or disabled by the person's family surroundings. Berger and Luckmann (1991) classify this as part of primary socialization, the parents or guardians instilling an interest in knowledge. He had a lot of respect for intelligent individuals. Contrary to a number of the participant's colleagues, this



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participant determined that a young knowledgeable individual can be right, and an older experienced individual can be wrong.

In absolute confidence, participant five volunteered that a further representation of knowledge is the physical machine he operated. In complete contravention of the Health and Safety Regulations the participant admitted putting his hand on the machines during operation to feel vibrations. He considered knowledge in the vibrations far superior than any training or advice he had received. This was his personal concealed knowledge that he would not volunteer due to the implications of contravening regulations. He had never been asked to share how he knew the machine was operating correctly and he added that possibly all the operatives had distinct insight into their jobs which was not known by management or anyone else in the company.

## **Participant Six**

### **Knowledge and people**

This Asian man in his forties clearly had a thirst for knowledge. In his opinion, adding to one's knowledge is just part of life itself. He was a UK immigrant and positive about the opportunities for everyone. Knowledge was a desire to know things and unrestricted. Participant six was confident that if you want to know something then there is always a means of acquiring that knowledge albeit from a book, a colleague or pursuing the source of whatever knowledge is needed.

The Focus Clustering performed by WebGrid III highlighted two groups of constructs also two rather loose groups of elements. In the latter, a distinguishing feature was the

first grouping, which included the participant and the owner manager but nobody else from the company. This clustering of the constructs emphasised seeking knowledge and identifying who has knowledge useful to the participant, invariably outside the company. The participant gave examples of situations where he needed to know something and was able to identify the correct individual who represented a source of that knowledge. Therefore, it was concluded that having a loose 'general knowledge' as contrasted with a 'depth of knowledge' was not a disadvantage as long as the general knowledge incorporated an identity profile of sources of knowledge.

Participant six agreed with the views of participant five in that an interest in acquiring knowledge is driven from childhood and the individual's family environment. The early or primary socialization formed the genre of knowledge seeker and also the genre of knowledge sharer. This linked to the strength of the person's character and knowledge transfer. A weak character, according to the participant, impaired the successful transfer of knowledge.

### **Knowledge representations**

Participant six volunteered six elements, one of which stood out as highly individual. He included his personal diary. It was construed as quite different, with a low correlation with all other elements. Constructs included issues surrounding accessibility and truth. The participant used the term 'positive' to describe things written down (in the work context). In his opinion, you do not intentionally write an 'untruth' because, explained the participant, if you are not absolutely sure then you would not bother to write something down. Thus writing something down acts as a seal of approval and reading



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something off the computer just isn't the same. The participant was very wary of the computer, he was aware of how easy it is to change data previously input.

His diary was a form of personal knowledge store and participant six was confident that the knowledge it represented was 'positive', that is accurate.

## **Participant Seven**

### **Knowledge and people**

Late forties uneducated white female with a particularly interesting view of knowledge demonstrated by the construct, 'knowledge becomes social – knowledge starts from within'. She deemed knowledge as 'being there' but needing education and confidence to bring it to the surface. Her principal components map distanced her from select elements due to what she perceived as not enough school, her struggle to take things in and her knowledge being restricted due to this lack of confidence with superiors.

Compare this with the owner manager, trainer and first person she thinks of in terms of knowledge who are all confident, social, had more schooling and 'built themselves up in their work'. However, this participant also represented a social dimension in the group that the Focus cluster diagram links together. The elements that are most highly correlated are an immediate colleague and another employee within the firm. Both appear as knowing less and their knowledge has stayed the same but the issue that they are easy to get on with also enabled the transfer of knowledge.

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The paradox revealed in this analysis is that the people who this participant recognized as knowing more have detached themselves from this participant who appreciated that she knew less. Those identified as knowledgeable were discriminated as less easy to get on with. In summary this participant construed knowledge, in the context of the people elements, as, 'learning from each other and more social'.

The repertory grid conversation digressed into areas that the participant could see herself as knowledgeable. In asking the participant to share her knowledge of knitting, her conversation flowed lucidly. The researcher, not personally adept at knitting, actively listened to the participant describing her vast knowledge of knitting techniques. Thus given the opportunity to converse in a known area the participant appeared to change from an individual with low self-esteem; in relation to the work situation, to an individual able to share her sound knowledge on a specific topic.

### **Knowledge representations**

This attitude of social acquaintance is also portrayed in the participant's view of a familiarity with explicit representations. Something was considered believable if it is used everyday and has proved to be reliable. The four most highly correlated elements were linked as pairs, the samples and trace cards in addition the main notice board and works manual. All these elements were produced by other members of the company staff. This suggested a positive notion of trust in other work colleagues, borne out by her numerous links in the socionet analysis.



A final point made by this participant was the involvement criteria. There were some explicit representations that affect a chain of reaction from other colleagues. Whereas reading the notice board and works manual only, according to this participant, potentially affect you, personally. The notice board was not construed as a trigger for dialogue with colleagues.

## **Participant Eight**

### **Knowledge and people**

An early twenties white male who was in his final year of a part time day release further education course. The participant joined the company as an apprentice but was now considered and remunerated as a qualified toolmaker. He grasped the notion of the research topic and was forthright in his views. This participant suggested that there is a knowledge hierarchy that sees certain knowledge as superior and this is linked to reliability and making a difference. This pinnacle of knowledge represented the constructs elicited from first element 'knowledge icon'. Theoretical knowledge was closely linked to knowledge that made a difference and the participant had considerable respect for individuals who have derived such theories.

The elements were discriminated on the basis of those with superior knowledge and those who learn from others. On the rating scale this participant placed all elements towards the superior knowledge pole with the exception of one colleague who was distinctly placed at the opposing end. The colleague was the new teenager apprentice. The participant was not restrained in his obvious dislike for the apprentice, describing

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him on one construct as “pretending to know”. The isolation of the apprentice is further illustrated and validated by the socionet section.

As could be anticipated from an individual completing a period of structured learning, the issues of historical, theoretical and practical knowledge were all apparent in the constructs. The historical point also included timeliness. Some historic knowledge has made such a difference that it has become part of our way of life but other knowledge is also historic but continues to be dynamic and changing. The college education was seen to be the groundwork for the knowledge derived from ‘proper experience’.

### **Knowledge representations**

According to participant eight, a pitfall for knowledge is its limitation when it becomes represented in books. This is knowledge ‘cast in stone’ and lacking progress. When asked to ladder the construct ‘have to read it – it’s interesting’ which did not initially appear to mean a great deal. The participant was able to expand to ‘process is not new – the process helps to add to knowledge’. Thus the participant relished the opportunity to use the computer and the internet as this was accessing information but also a stimulating process.

The participant viewed his college experience as primarily based on knowledge of what happened in the past and ‘behind where we are today’. However, the participant recognized that knowledge can be acquired both through formal learning techniques and experience but the division was strongly in favour of experience. This suggested a certain degree of cynicism for the college course.



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## **Participant Nine**

### **Knowledge and people**

This mid fifties white female looked upon immediate colleagues as all similar to herself. They were people to have a laugh with, pass on gossip and who 'don't know a lot'. An individual she identified as representing knowledge was someone she could talk seriously with and taught her all she knew. She depended on them to teach her and they were described as 'brainy'. In order to become brainy the participant recommended reading more and studying.

### **Knowledge representations**

The explicit representations were distinct due either to what knowledge they offered on the company or what is happening in the world. The participant initially found it difficult to think of items that represent knowledge. In the first elicitation conversation she summed up knowledge as being concerned primarily with books and the reading activity and yet her own elements in the second conversation did not include books. However, this could be explained by the notable lack of books in the work environment. With the exception of works and tool manuals the only other books were in the managements' offices.

From the six elements the participant had offered three media forms of explicit knowledge artifacts – television, radio and newspapers. The television was considered most useful and it was also accessible at a relaxing time of day therefore her concentration was improved. The participant 'believed' in most of the material delivered via the television. There was no question of bias, entertainment enhancement or

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selectivity. Contrary to tabloid newspapers, also considered a great source of enjoyment even if they were not a precise portrayal of what was happening in the outside world.

## **Participant Ten**

### **Knowledge and people**

This participant contributed to a challenging interview. A white male aged about thirty with learning difficulties. He could neither read nor write and therefore the researcher needed to alter the method to suit. It was also clear that the participant was not able to focus on the topic and preferred to direct the conversation to various grievances and incidents with his employers. In essence the participant determined those with knowledge were '*not grafters*' but were able to '*use their loaf*' and those with little knowledge were classified as 'not so clever' but 'grafters'. This distinction between grafting and intelligence had arisen previously with participant three.

Knowledge was summed up as learning through life. Much of what you need to know can be 'picked up'. If you want to know more then everyone was seen as equally capable of achieving more but some just choose not too. It was unrealistic to attempt a complete repertory grid conversation in this instance.

## **Participant Eleven**

### **Knowledge and people**

A white male nearing retirement who was notably thoughtful and interested in the topic of the repertory grid conversation. He returned once again the following day, in his

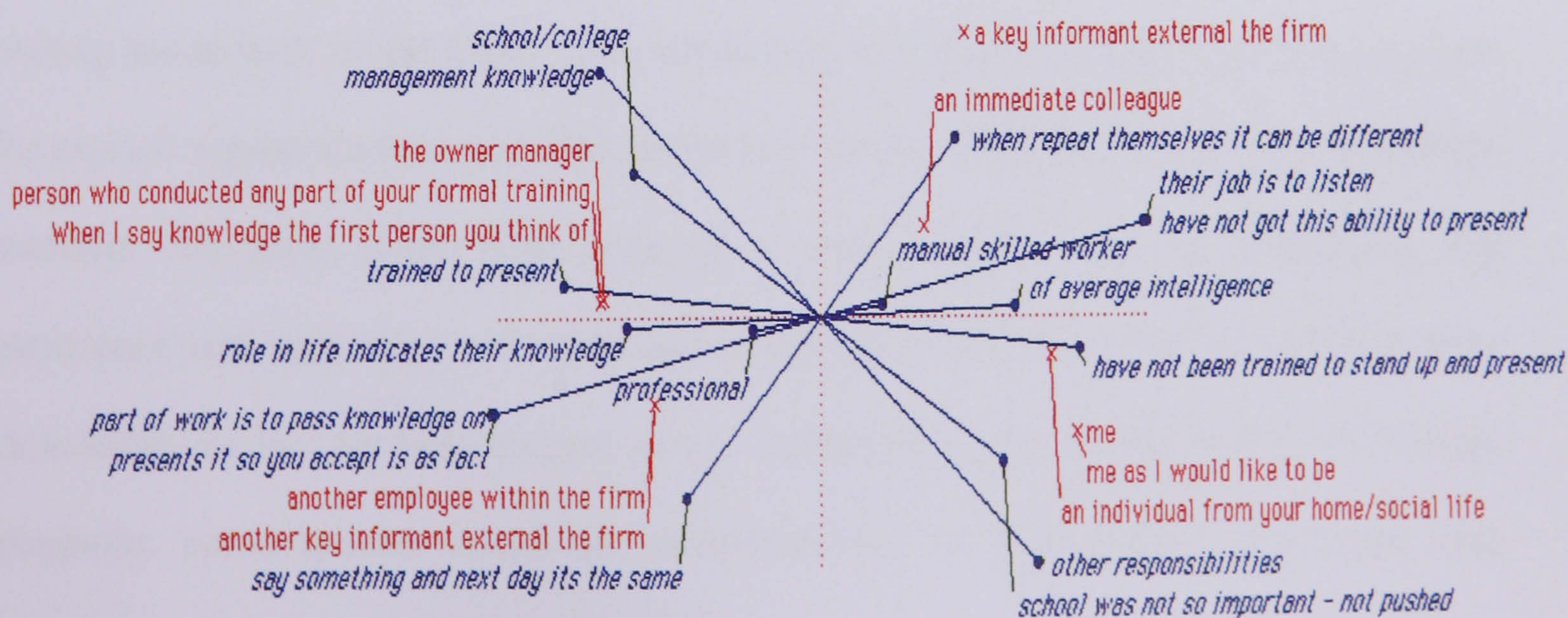


lunch break, to discuss the topic and commented that nobody had ever asked him questions on such a dimension and he found it fascinating. The participant was very content and rated all the constructions identically for 'me' and 'me as I would like to be'.

Two other elements also form a pair and they are 'key informant external the firm' and an 'another employee'. In addition a trio is formed from 'the person who symbolizes knowledge', the 'person who conducted any formal training' and the 'owner manager'.

Turning to the constructs, presented in Figure 18 there was a distinct discrimination between those who are responsible for passing knowledge on and are able to do so because they are capable of presenting what they know. Contrasted with those whose 'job is to listen' and are not able to present. This raised the issue of knowledge transfer being inhibited by people's inability to communicate or identification as knowledge communicator.

FIGURE 18. PARTICIPANT 11 PRINCIPAL COMPONENTS MAP (KNOWLEDGE AND PEOPLE)





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The participant saw an individual's role in life as an indicator of their knowledge. He suggested that those who opted for less high profile roles were not knowledgeable.

Another link is made between school or college and management knowledge. Without the benefit of a formal education the participant deemed a management responsibility as being unlikely.

The principal components map illustrated in Figure 18 also groups together the knowledge presenters as transferring knowledge reliably, they 'say something and the next day it's the same'.

In summary the participant viewed knowledge and people as a collection of ideas. The accessibility to the knowledge of others is improved as you get to know the person and can share in their ideas.

### **Knowledge representations**

Leading to the second stage of the interview the participant announced the 'something in writing has to back up the ideas'. The 'something in writing' volunteered in the elements for explicit representations included instruction sheets, works manual and the machinery manuals. All these items were opposed to the computer and the telephone. The participant was unfamiliar with both and commented that they contained 'hidden away knowledge' he had not been trained to use. Additionally, knowledge passed on through telephone conversations could be misinterpreted. A face-to-face discussion was considered a far better indicator of reliability.



The participant had a personal preference for the training videos as those he had seen were well produced and placed issues in a complete context. They illustrated visually the historical background to a task or routine and consequences of the task/routine not being carried out correctly. Ideally, he suggested training videos produced in the company using employees would make them even more pertinent to the training issue. Any material that was produced in-house was construed as possessing greater validity than that supplied external the firm.

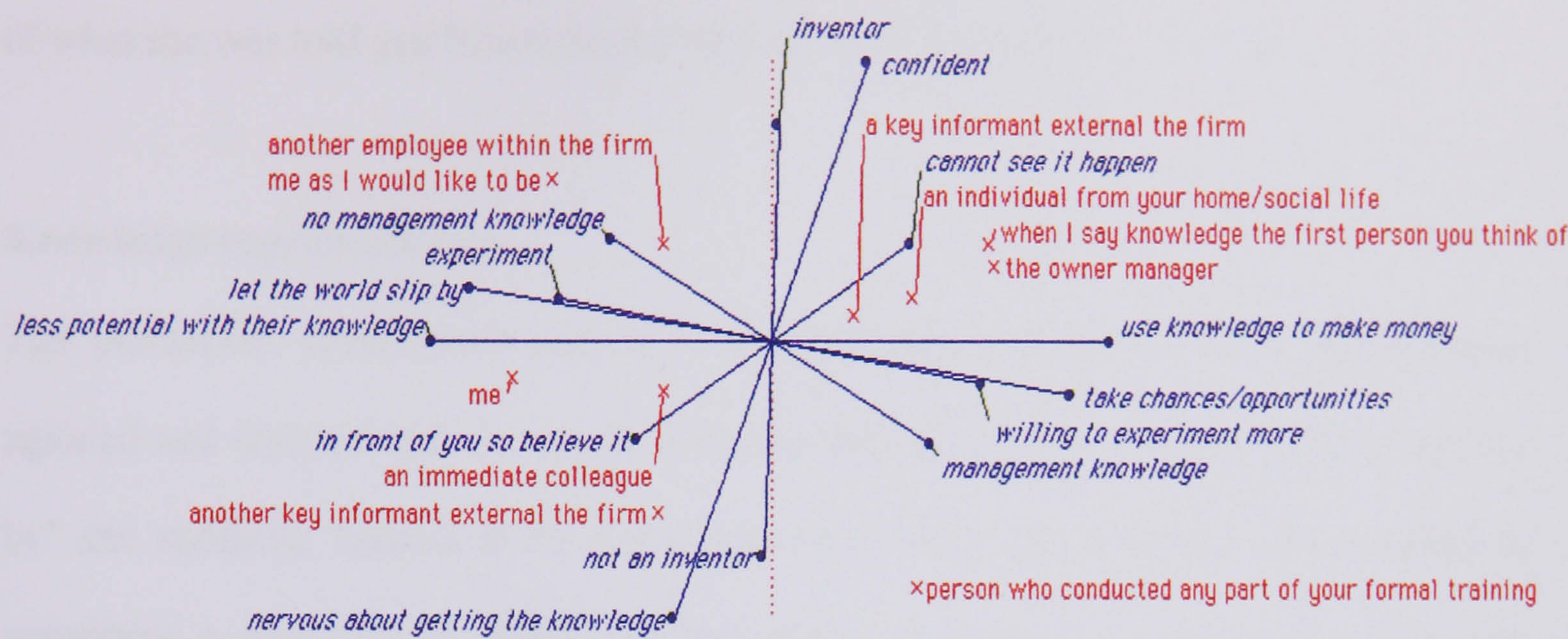
## **Participant Twelve**

### **Knowledge and people**

This white female in her fifties made some obvious distinctions between the elements. The principal components map in Figure 19 revealed the horizontal axis as ‘less potential with their knowledge – use knowledge to make money’ and the vertical axis as ‘inventor – not an inventor’. The construct of inventiveness was alongside confidence and the inability to predict (‘see things happen’) and on the opposite pole was a revealing construct ‘nervous about getting the knowledge’. The latter complemented by two other points. The first was the notion of seeing is believing. The participant preferred something if it was physically presented as in her view your eyes cannot deceive. The participant recognized that others are less reliant on sensual evidence and would delve deeper to understand a phenomenon.



FIGURE 19. PARTICIPANT 12 PRINCIPAL COMPONENTS MAP (KNOWLEDGE AND PEOPLE)



Those with less potential to use their knowledge were also linked to ‘let the world slip by’. This suggested that the participant was aware others in her social world were not willing to alter or challenge existing constructs. The researcher considered a stagnation of construct review as disabling and constraining on a working environment where management and stakeholders were looking to maximize potential opportunities. However, equally damaging is the situation whereby management ignore employees’ preferences to adhere to existing constructs and thus alienate their employees.

With the exception of the owner manager all other elements discriminated as experimenters, taking chances, unpredictable and confident were outside the company. Knowledge from the elements inside the company adopted a very different persona.



Participant twelve called for a greater level of frank interchange in the company as a means of improving believability. She commented that fellow employees were constantly politely evasive rather than open and candid. This had led her to distrust a lot of what she was told and forced her to want to ‘see it for myself’.

### **Knowledge representations**

The participant commenced part B of the repertory grid process but then became agitated and disinterested. It was as if by her own admission of ‘letting the world slip by’ she suddenly wanted to be active and away from this situation. When asked to contribute a summary in respect of knowledge and explicit representations it was, whatever offers easiest access provides the most information.

### **Participant Thirteen**

#### **Knowledge and people**

A white male who was approaching retirement and had worked on a manufacturing shop floor all his life. The constructs were divided into two main groups with just one construct set apart. This construct involved the transfer of knowledge and arose due to a triad of elements with an immediate colleague who clearly was not relaxed about sharing what he knew. All the other nine elements were rated as ‘open to help’ with this one exception. Returning to the two groups of constructs, one group is led by ‘unlimited chances’ and the other group ‘limited by parents attitude class’.

As can be seen from Figure 20 the participant saw a relationship between knowledge and what Berger and Luckmann (1991) describe as primary socialization. He did not feel

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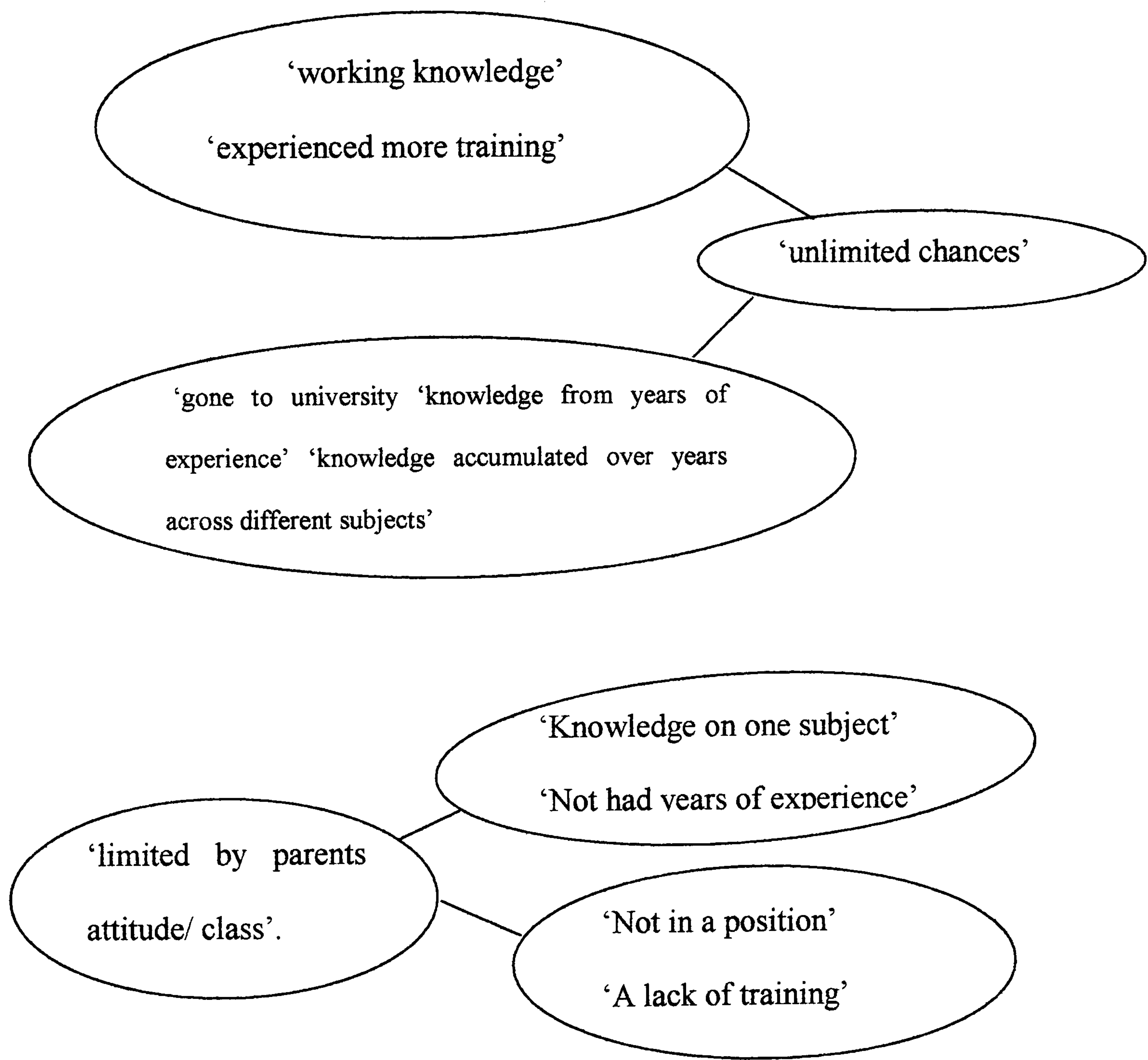
completely limited by his background but he saw this was a limitation in others around him. In the socionet analysis it was found that participant 13 had reciprocal constructs with participant two and eighteen. Participant two, in common with participant thirteen, saw a distinct division between himself grouped with external individuals and one colleague and other elements. In the cluster analysis the participant as 'me' is grouped in another group to the 'me as I would like to be'. A potentially relevant link between participants thirteen and eighteen is the emphasis on external sources of knowledge.

The pole of the construct 'confident what they say is right because of position' indicated a barrier to knowledge transfer. This individual found knowledge of colleagues in less senior positions not as convincing as that of others in more senior roles.

In summary this participant commented that knowledge does not have a specific value but it makes you a 'better person'. In explaining 'better' the participant used the term confident. Thus contrary to selective areas of academic thinking, knowledge can not be labelled with a value because all knowledge has a value personal to the individual.



FIGURE 20. PARTICIPANT 13 DIAGRAM TO ILLUSTRATE TWO MAIN CONSTRUCT GROUPS



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## **Knowledge representations**

The list of elements volunteered by this participant for the second part of the conversation offered familiar items such as books, computer, drawings and so on. However, when the grid was complete the participant added that he kept a personal notebook at work. It transpired that he kept a notebook as a matter of course throughout his working life. In the notebook he jotted reminders about particular aspects of the work he had been involved in. This storage of personal notes was common to participant six who also kept a diary. It was interesting to note that neither diary nor personal notebook were initially volunteered as elements possibly due to their idiosyncratic meaning.

Participant thirteen would never suggest that everyone kept a notebook and they became part of the company documentation because he did this in his own time. There is not the time during the production process to start writing things down and besides many of his colleagues would find this activity challenging. Therefore, in this participant's view all knowledge in the company context had to be transferred by word of mouth.

On his retirement he planned to leave the notebook in the company.

## **Participant Fourteen**

### **Knowledge and people**

This mid-forties white female categorized herself in a group that had not used the chances they have had and do not learn from the mistakes that they have made.



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Knowledge was personified by the group who has had a 'better start in life', learn from the mistakes they made and experienced a variety of events. This latter group encompasses the providers of knowledge as against the non-providers.

In common with participant twelve this participant also commended the ability to be frank rather than 'beat around the bush'. This direct approach was linked to the element in the role of knowledge icon and providing a key to the authority with which knowledge is communicated. This division materialised, according to the participant, because there were some people in her social environment who had not been taught to express themselves whereas others had the confidence to speak out, act upon what they knew and learn from the experience. This disadvantaged group were frightened to use what they knew even when they were certain.

The picture of a company in which people were frightened to use what they know was an indictment management would contest. In earlier interviews senior management used convivial family metaphors not an image of autocratic top-down intimidation.

### **Knowledge representations**

This participant was an avid reader of light fiction. Her views on explicit representations of knowledge were limited to a description of her engagement with the items. She added that the computer and internet did not appeal. The notice board was only considered of value if it was updated regularly. She was interested in the items on the notice board that mentioned familiar people, places and companies.

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Issues involving reliability, validity and accuracy were not considered in any detail. The sole comment on this theme was the believability in representations that she had personally contributed.

## **Participant Fifteen**

### **Knowledge and people**

This mid forties West Indian male approached the theme of the conversation with great interest. He found the repertory grid process too complex and it appeared to inhibit rather than assist with any communication. The participant had a strong native accent which also complicated the process. A total of four constructs were elicited which was insufficient volume for any meaningful cluster or principal components analysis. Thus analysis had to be an immediate manual response and a laddering of the constructs that were elicited.

Immediate insight was provided by his choice of element for the role title of ‘when I say knowledge the first person you think of’, this was - his mother. A woman with little formal education and only occasionally employed in paid work. Knowledge was not personified by financial success or status it was closer to qualities such as spiritual, loving, forgiving and serenity. He saw her as a ‘survivor’ and thus strong in both a physical and mental sense. He respected her for passing on her knowledge of survival and the need to maintain an ‘active mind’. He was deeply deferential of his mother’s ability to pass on her knowledge. Knowledge that was of not great value in the context of his work but deeply meaningful to the knowledge of engagement with life.



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He saw knowledge as related to the cultivation of the intelligence that we are born with and that cultivation was aided by the environment. He deemed this cultivation begins from childhood when children break things. There are parents who will chastise the child and throw the pieces away and then there are parents who will take the time to help put the pieces back together. This interest in the child develops the active mind and motivates the child to learn. His mother always appeared to have the time for her children to explain and nurture curiosity.

In rating how others in the role title elements know what they know, the participant always rated himself the same or close to his mother, everyone else was different. He felt he knew more about 'life' and the others know about 'work'. The conversation moved to his own role as a father and how he had aimed to instil the same parenting skills as his mother. He was clearly proud of his children's achievements, one at university and others in full time education.

According to participant fifteen we are all born intelligent but our utility of this intelligence is cultivated by the 'right people'. He had an active mind and was always interested in new things – ranging from the home computer he had recently purchased to how to update and install new central heating in his home. Participant fifteen was clearly skilled in a vast array of activities and had a broad knowledge of issues outside of the workplace.

Later, a socionet analysis discloses participant fifteen as an isolated individual with inadequate constructs to understand the meaning of others. Additionally, none of his

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work colleagues appeared to possess adequate constructs to understand him. The different cultural background of participant fifteen, his outlook on life, language and mannerisms would certainly serve as potentially alienating factors. This fascinating outcome deserves further exploration and is addressed in the final chapter.

### **Knowledge representations**

In looking at explicit representations of knowledge, the participant only focused on the computer which intrigued him and the works manuals that he could use independently. The participant had no access to a computer at work but as mentioned previously he had purchased a home computer for his children. He appreciated the important part information technology played in society and wanted to be part of this change.

The reference to ‘use independently’ meant that the participant could refer to the manuals when time permitted and without encroaching on others

### **Participant Sixteen**

#### **Knowledge and people**

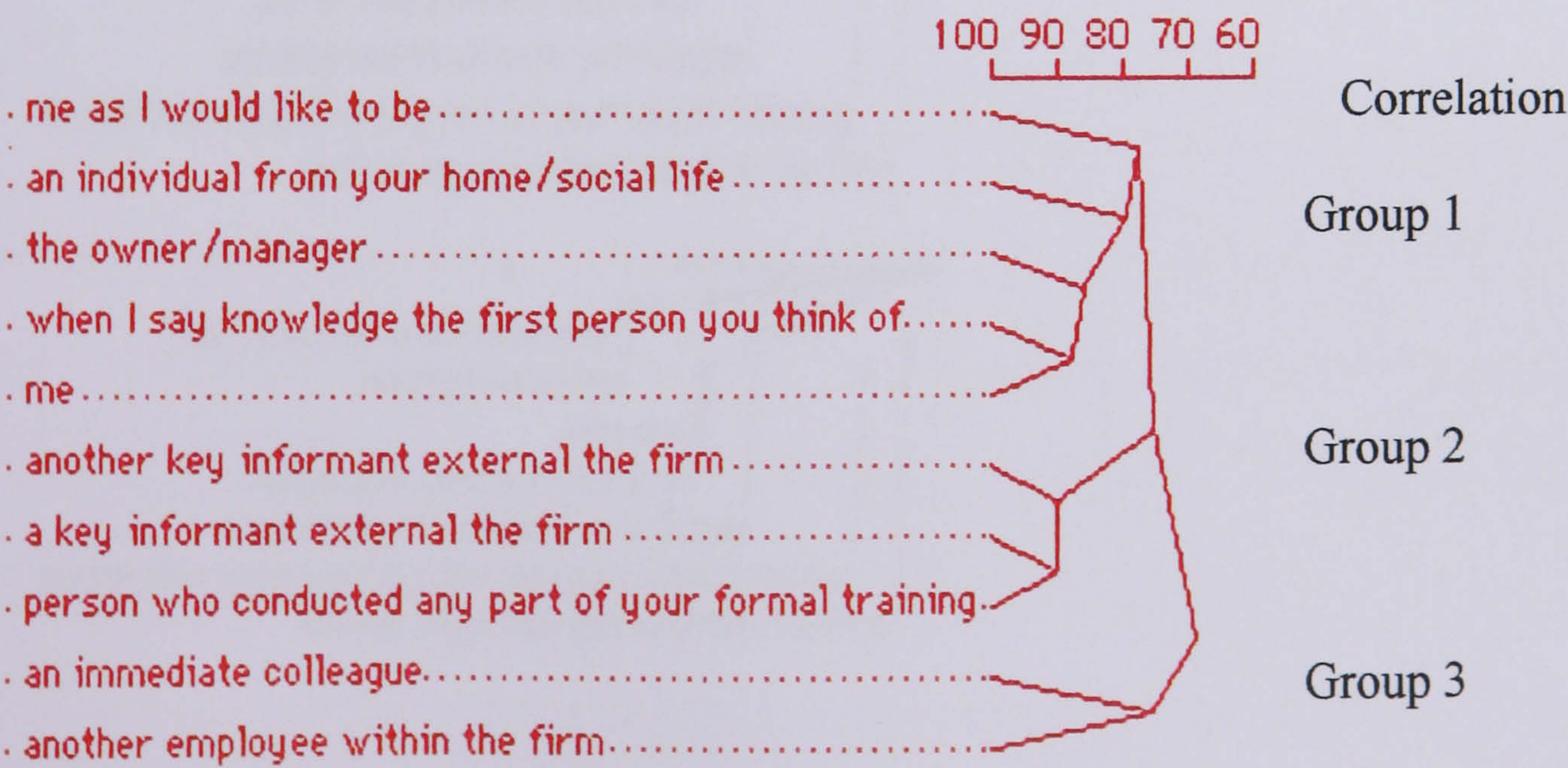
A white female approaching retirement and married to a board director. This participant postponed her involvement on a number of occasions but eventually a convenient time arose to proceed. An initial tension needed to be explored before the repertory grid process could commence. Participant sixteen was unable to see the benefit to the company in becoming involved in the research topic. In her opinion the company was functioning at its optimum capacity and any research was not going to have any effect on the organization. These concerns were discussed and eventually overcome.



A fascinating insight ensued into this participant’s meaning of knowledge in relation to people in her social environment. Firstly, addressing the elements themselves in relation to the context of how people know what they know. The only participant to show a high correlation between herself and the initial element ‘when I say knowledge the first person you think of’. Also a clustering of elements, with three distinct groups (See Figure 21). Group 1 included the participant, her husband, son and a close friend. Group 2 were all external the company and Group 3 were the two individuals she works alongside.

Turning to the constructs, in this context, they grouped predominantly around two bi-polar themes, that of people who reason things out more and those who are blinkered and cannot always see. The Group 1 elements are placed in the category of reasoning individuals and the other two groups fall into ‘blinkered’. The Group 1 elements are also ‘sociable’, ‘open and communicate’, ‘trustworthy’ have an ‘in-depth knowledge of their own job’ and from a ‘different strata of society’.

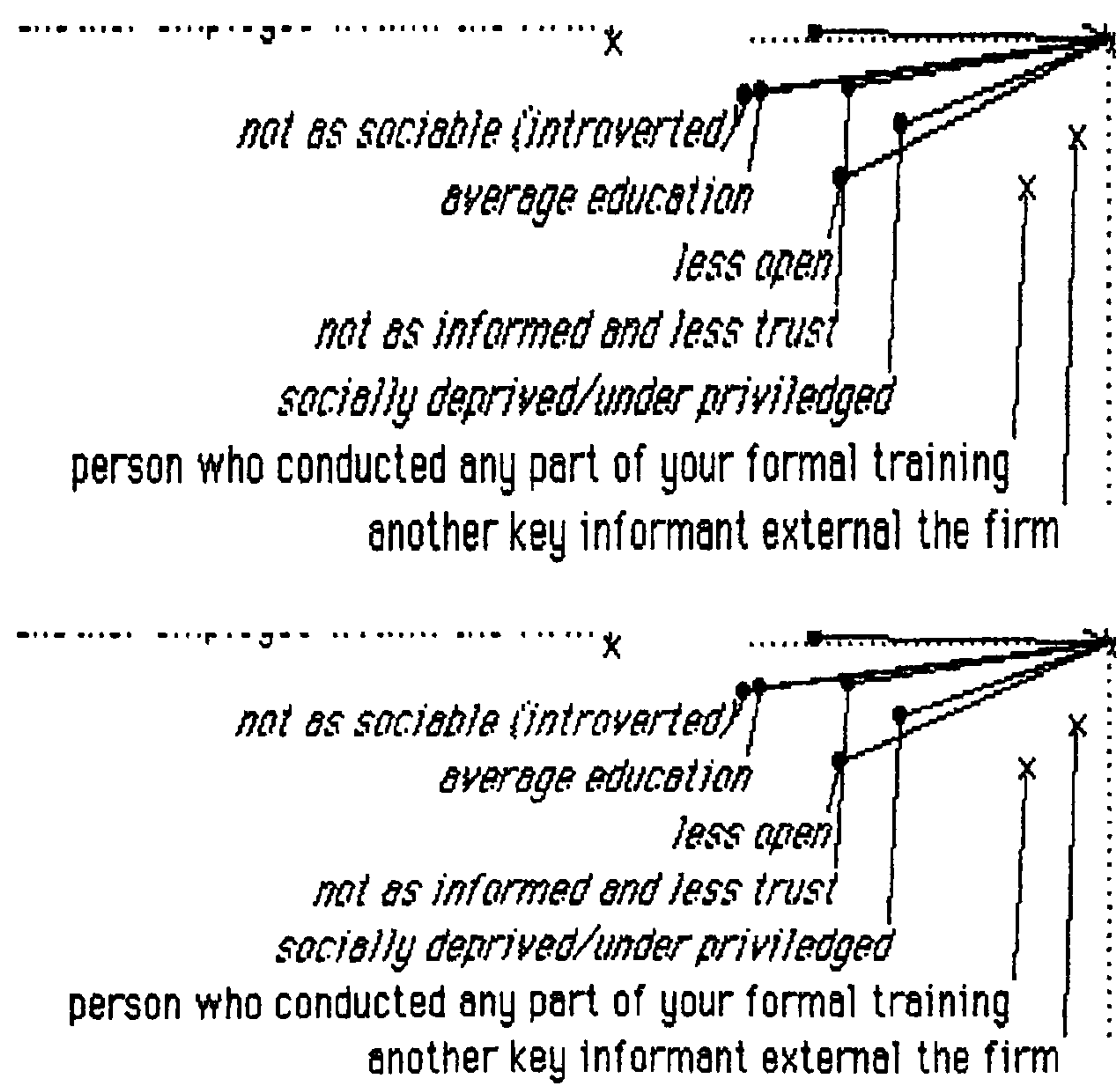
FIGURE 21. PARTICIPANT 16 EXTRACT FROM CLUSTER DIAGRAM (KNOWLEDGE AND PEOPLE)





The foundation for knowledge according to participant sixteen was the ability to communicate which may be gained from a good education. By ‘good’ the participant was referring to her own grammar school education which she felt had ‘lifted me up’. The theme of academia arose on a number of occasions and clearly affected her constructions. The researcher explored, with the participant, the meaning of “socially deprived – privileged/different strata of society” and this again had it’s foundation in education. However, the participant was keen to point out that an individual’s outcome is related to “luck”. That is, born in the right place at the right time affected your later life. This division in the participant’s discrimination as shown in Figure 22 would undoubtedly have a bearing on knowledge sharing. This first part of the process became particularly lengthy and touched upon some raw core constructs that the participant appreciated were controversial.

FIGURE 22. PARTICIPANT 16 EXTRACT FROM COMPONENTS MAP (KNOWLEDGE AND PEOPLE)





## Knowledge representations

Turning to the explicit representations of knowledge, it was agreed the issue would be discussed rather than complete a full repertory grid. Three elements were volunteered, the computer, books and company records. The participant considered information extracted from a computer not totally reliable as it was '*only as accurate as what is put in*'. A book was considered of far greater value due to the editorial and publishing process. The participant commented that a book takes time to be published and considerable cost is involved so therefore the content of the book must surely be correct. A book would be thorough because of the people involved in the process. The company records were viewed as extremely reliable due to the regulations governing the company personnel to ensure records remain accurate.

However, when the participant wanted to be completely sure she would always prefer to contact '*an expert*' who had full knowledge of the issue.

## Participant Seventeen

### Knowledge and people

A white, early forties female. This participant found it difficult to follow the theme of the research and some initial constructs are descriptive of the activities that the elements are involved in rather than the knowledge subject. The participant construed knowledge in relation to the specialists of the elements, for example, management knowledge or computer knowledge. The education issue arose with the construct, '*probably brought up with university background – trained more with skills at work*'. The participant was not entirely content and would have preferred a broader range of knowledge.

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From the elements, the focus analysis linked the three elements that related external the company. The low correlation between the constructs reveals only a tentative grouping of: in house knowledge, less knowledge of management and trained with more skills at work.

In discussion, the participant referred to knowledge as the passing of information between people. Knowledge transfer featured highly throughout the conversation. She commented on the skills required to assist in knowledge transfer and the need “not to look down on people”. This suggested that participant sixteen worked with individuals who she deemed as mistaken in undermining others. In the socionet analysis it was found that participant sixteen, working in the same office as participant seventeen and nineteen did not hold any commonality or sociality in construing. During the researcher’s time in the company, participant sixteen was seen as popular and light-hearted with many of the shop floor employees.

Relationships between people were either positive for transferring knowledge or negative. When asked to describe a negative situation, the participant volunteered the situation where ‘you just want to walk on’ or ‘you don’t concentrate’.

### **Knowledge representations**

In response to the conversation involving the representations of knowledge, the participant’s outcomes are summarized by accessibility. Computers were seen as containing a vast array of knowledge that was personally easy for her to access although difficult for others. This point was further emphasised in her summary when she asked



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to have this point stressed. She thought it wrong that all staff were not trained to gain access to the company computers and encouraged to use them. Interestingly, the company handbook was construed as ‘past knowledge’. The summation of this latter theme reverted back to the people issue with the participant declaring her preference for all verbal communication.

## **Participant Eighteen**

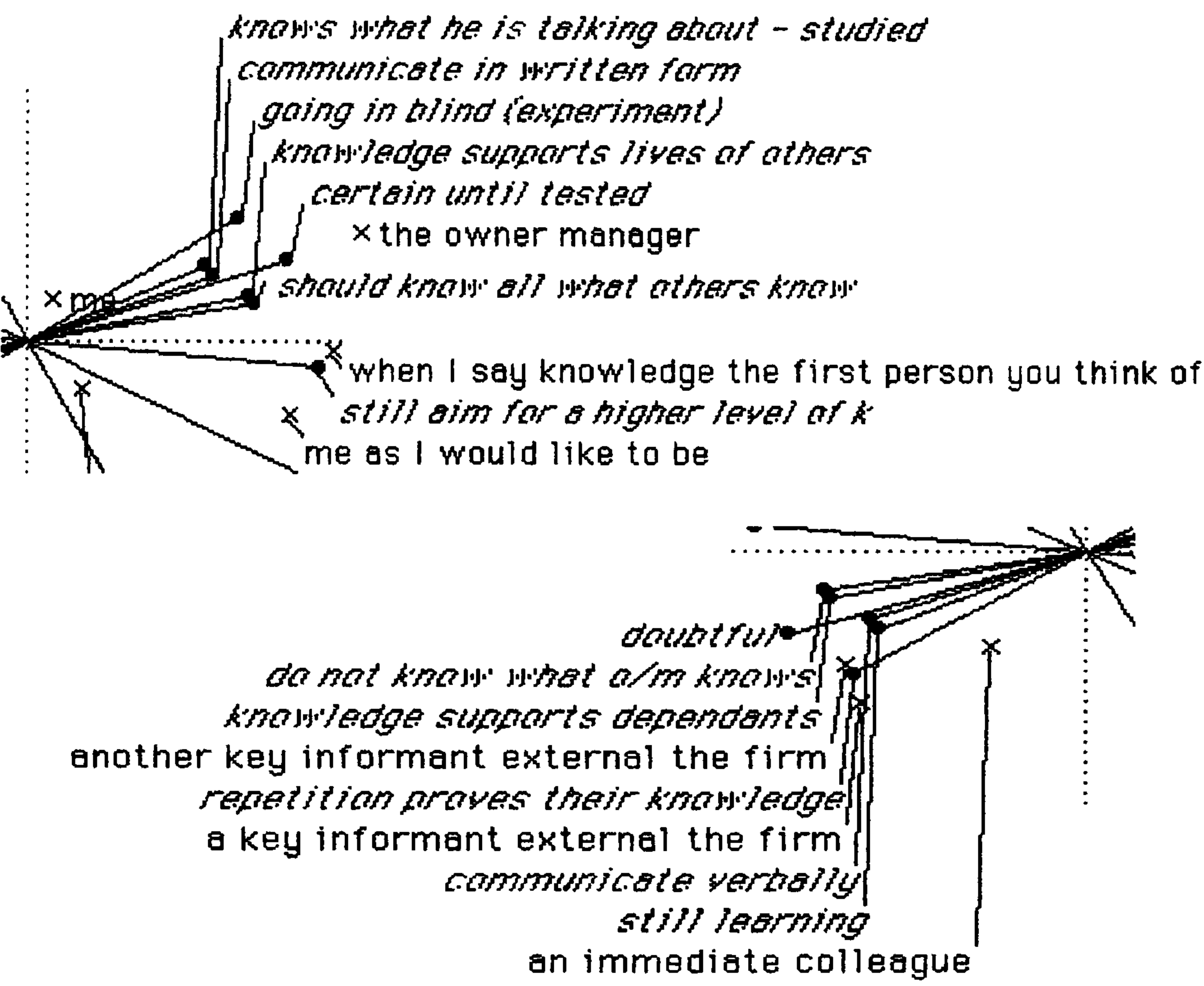
### **Knowledge and people**

A mid-thirties white male who expressed his constructs coherently and with enthusiasm for the process. The dominant message that participant eighteen offered was one of knowledge as a ‘never ending process’. His inspiration came from his element that personified a knowledge icon. The construct ‘going in blind – knowing from experience (repetition proves it to you)’ was also seen as a dominant discrimination. The Figure 23 below extracted from the principal components map highlights two particular clusters.

As expected for an individual in the position of dispatch, his work responsibilities led to contact with a number of external informants. This was contrary to many other shop floor employees who had little contact outside the company. The participant was irritated by the dominance of the customer. He sensed they had considerably greater knowledge than they are willing to share with their suppliers. He wanted the case company to be more assertive in their relationship with customers. The participant sought ways of improving the current system and admitted that his approach to tasks was quite different from the prescribed job specification. When asked how a

replacement would gain the same knowledge of the job, the participant considered it could only be transferred through a lengthy job shadowing as he rarely wrote things down.

FIGURE 23. PARTICIPANT 18 EXTRACT FROM COMPONENTS MAP (KNOWLEDGE AND PEOPLE)



### Knowledge representations

The explicit representations of knowledge produced just four constructs. The participant expressed that he would question the output from the computer because it was not a 'written document'. Elements were construed in terms of their content, currency and specificity.



**Participant Nineteen**

**Knowledge and people**

Female, white and in her late fifties. Participant nineteen deemed knowledge as progress “it got us out of the caves” and a fundamental way of life. In her view, everything we experience contributes to knowledge and as we expand our knowledge then further opportunities arise. The focus clustering does not offer any highly correlated clusters in either the elements or the constructs. The two poles of one group of constructs are fitting with the knowledge communication/transfer and family origins themes.

Slow about getting to the point	Forthcoming (straight to the point)
Not the family support	Family orientated
Not so formal training	Lot more training
Always searching for the right word	Very good communicator

An attempt by the researcher to ladder her construct not daft – a lot more intelligent had a modicum of success. The participant was able to explain that she was going to use the term unintelligent as the contrast to intelligent but thought it was ‘too strong’ and thus preferred –not daft.

**Knowledge representations**

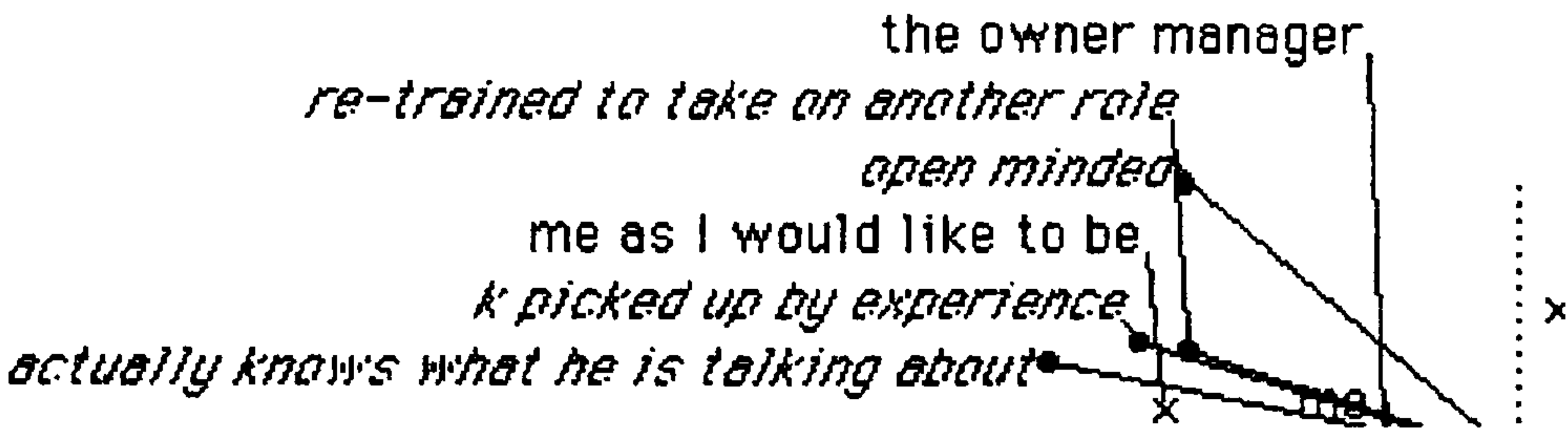
Once again the notion of input arose with a sense of ownership in a representation that was partly created by oneself. In addition the repeated issue of distrust in the computer and this time it was due to reliability of hardware.

Participant Twenty

Knowledge and people

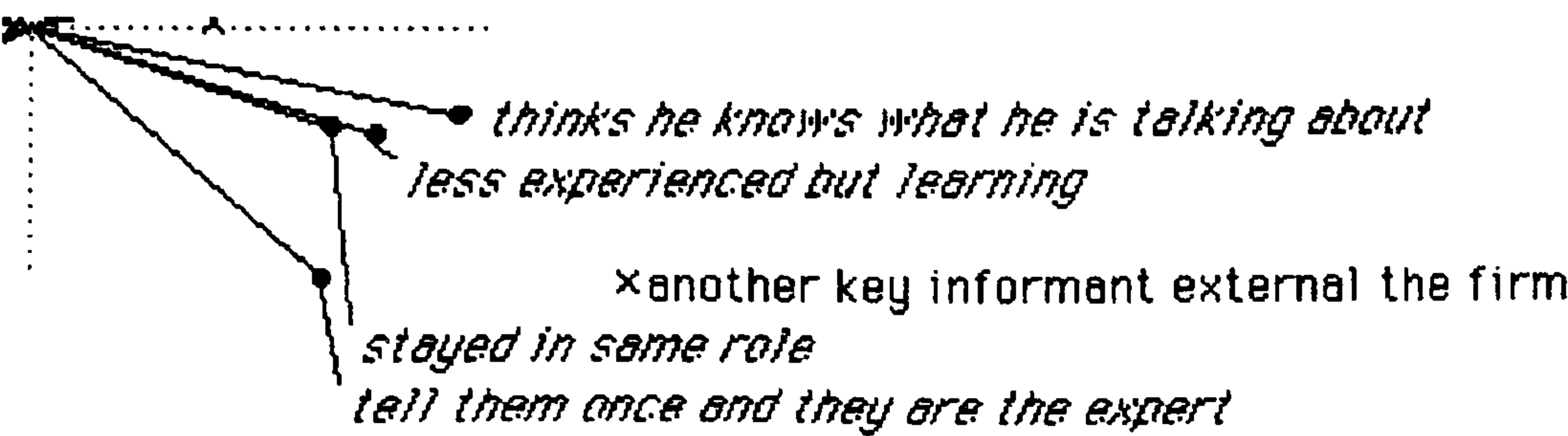
Male, white approaching retirement who showed a great deal of respect for the owner manager. The participant wanted to be closer to the owner manager (see Figure 24 (a)) than he appeared. The owner manager was described as knowing what he knows due to, ‘open’ and ‘picked up by experience’. In clarifying what was meant by experience the participant explained this was the engagement with many different situations. It was not the repetition of the same event over many years.

FIGURE 24 (A). PARTICIPANT 20 EXTRACT FROM COMPONENTS MAP (KNOWLEDGE AND PEOPLE)



In contrast to the respect for the owner manager distaste is shown for another key informant external the firm, Figure 24(b) It is clear that knowledge transfer opportunities with this key individual were dampened by the participant’s constructions of doubt and criticism.

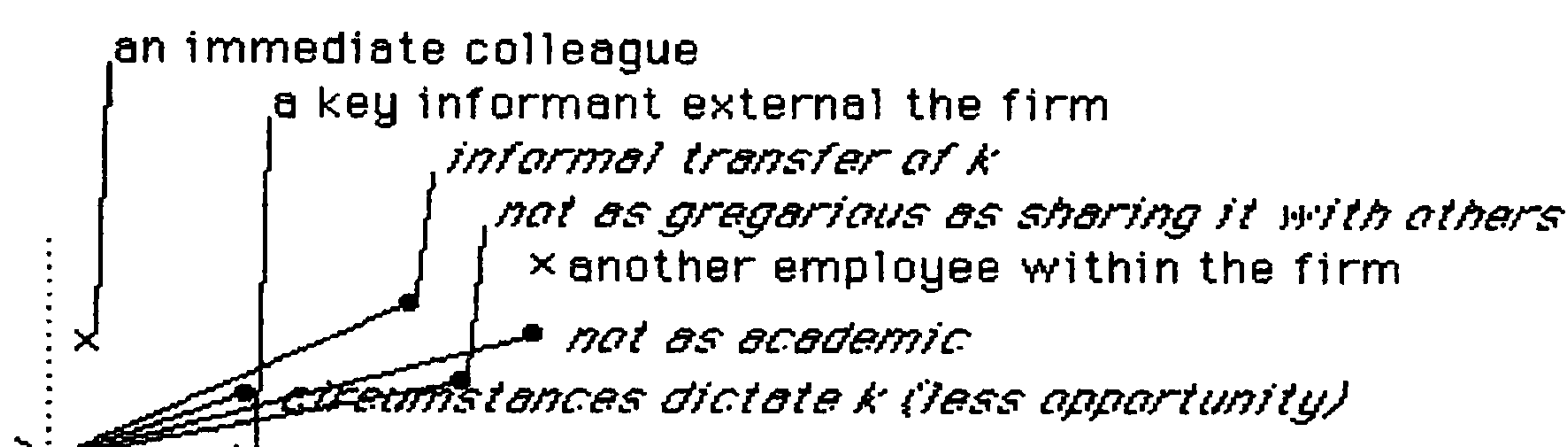
FIGURE 24 (B). PARTICIPANT 20 EXTRACT FROM COMPONENTS MAP (KNOWLEDGE AND PEOPLE)





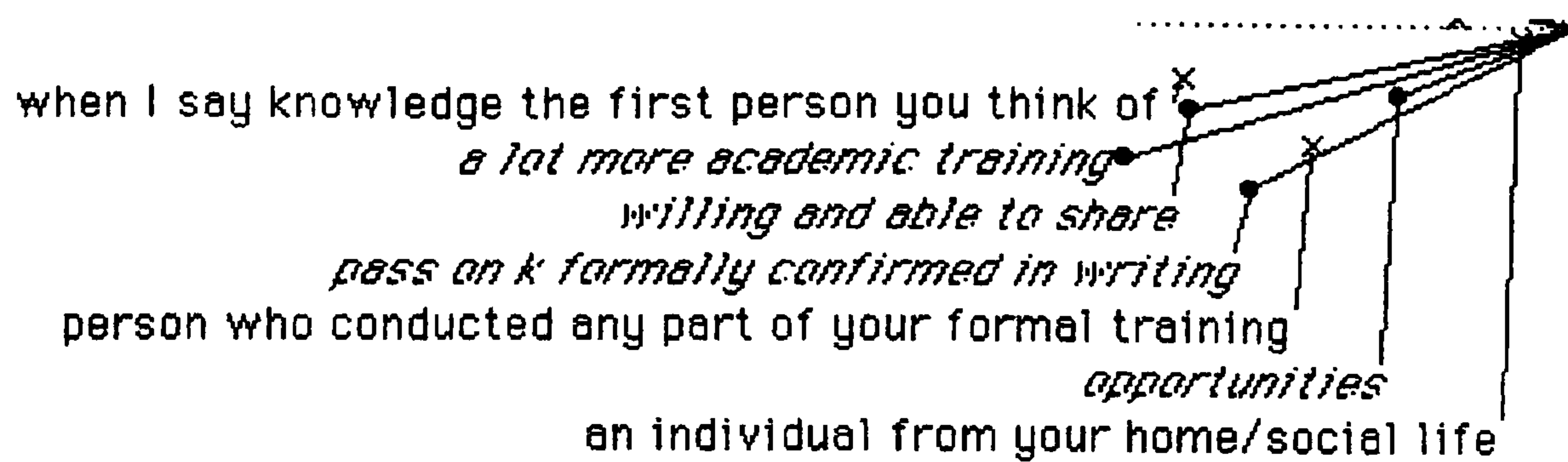
In the third quadrant of the principal components map, Figure 24 (c) the participant used constructs of opportunity and informality. This group has not had the academic support of others and this produced a link to their degree of sociability and openness. The participant did not see this as due to his own superior role, as a Board Director with a considerable length of service.

FIGURE 24 (C). PARTICIPANT 20 EXTRACT FROM COMPONENTS MAP (KNOWLEDGE AND PEOPLE)



The final quadrant, in Figure 24 (d) incorporated three roles all outside the company. This group epitomize knowledge by their academic background, willingness to share what they know and by committing themselves in writing. The participant revealed his wife was a teacher. In summarizing his thoughts on knowledge and people and viewing the completed repertory grid the participant explained knowledge was a passion, a particular passion to achieve and thus determining the accrual of knowledge. The passion came from within and such individuals need an audience to 'buy-in' to their knowledge. They share the knowledge within their social environment because it either confirms or denies what they thought they knew.

FIGURE 24 (D). PARTICIPANT 20 EXTRACT FROM COMPONENTS MAP (KNOWLEDGE AND PEOPLE)



The focus cluster illustrated a slightly alternative picture. The highest correlation was between the participant, a colleague and his wife. They all appeared central on all the construct poles. The known common link was that this specific group were all approaching retirement and thus similar in age.

### Knowledge representations

The participant sensed that items exist in the firm that helped solve specific problems but others only offer a broader view. There was not an area where all issues in respect of company processes and systems could be viewed. The participant preferred representations that contained his own input. It is relevant to note in the principal components map that the construct 'robust – flaws in the system' was so closely positioned to the 'I input' construction. This involvement in the creation of data provided a sense of ownership and value.

The internet and the trade magazines were criticized for their inaccessibility. Physically they were accessible but actually retrieving what you wanted to know was time consuming. The other electronic forms of element were the e-mail and the internal



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database system. Both of which the participant had no difficulties in using but the researcher sensed distrust for the storage capabilities. Hard copies of all e-mail correspondence were stored in a manual folder and other data was also printed and stored in Project folders.

### ***Section 2 Summary***

This lengthy section aimed to examine each of the individuals as sub-units to this case. It was a rare opportunity in small firm research to encounter such insight across craftspeople, administrators and management. They have revealed multifarious constructs and a unique insight into their philosophical make-up. Thus it would be wrong for this section summary to converge these differences and summarise any general findings. There is room for individual human agency as well as the collective (Tsoukas and Vladimirou, 2001). The emphasis in this summary has to be on the uniqueness of each individual. It has revealed the alternative mix of themes dominant in the construct elicitation.

### **Knowledge and people**

For some this was a quality that was developed and nurtured from childhood. One participant offered that knowledge and people was 'life itself'. The constructions in this section were rarely difficult to elicit and the participants enthused about the theme. People enjoyed talking about people in the context of knowledge. How people know what they know possessed a degree of commonality, many referring to the skills

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essential to transfer knowledge, whilst other participants appeared to dwell on their personal upbringing and sense of missed opportunities.

A compelling picture of the mixed collection of themes was meaningful to the research question. For some academia and experience were acutely linked whilst others construed values and experience. Confidence in personality and communication arose in many instances but at times the confidence linked with status and others linked this with training.

The openness of the participants was attributable to the overriding sense of confidentiality and the one-to-one engagement. This added to the depth of insight provided by each participant. Strong views about colleagues were shared and highlighted the constraining factors on knowledge sharing even within such a close small community.

Individuals performing near identical tasks were not always of the same mind as to the meaning of knowledge. The experience theme touched on throughout by the press operators could either mean a lot of experience in the same job or a lot of experience of the world.

The constructions of knowledge converge and separate, some core constructions remaining unmodified and unexposed for considerable time. The process of the construct elicitation revealed ambiguity and fragmentation. However, the role of the researcher was not to condemn or change the constructs but to share in their meaning.



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## Knowledge Representations

This section always stumbled in comparison to Part A. The main procedural difference was a requirement to volunteer elements. For some their encounter with any representation was intermittent. Their work routine involved very little in the way of explicit representations of knowledge. The predominant paperwork being the job sheet linked to a trolley of items for processing. Their movement from the work station was limited to breaks and lunch. At these times they gathered in the canteen. In contrast the administrative and management staff encountered a number of alternative representative forms of knowledge.

Once again the themes analysed in the cameo analysis arose as an individual amalgamation of constructs. Predominant amongst the constructs were demands the representation placed on the individual, the range of knowledge and whether the participant was involved. Books were often seen as reliable and correct but time consuming. Computers were a mystery for some and an enjoyable experience for others. A most telling feature, arising from the research engagement, was the minimal exposure many employees had to explicit representations or artifacts. Employees performed tasks and functioned within the company without the need to read or write any notable amount. Few employees were asked to document their work and two employees had felt the need to keep their own personal records.

The employees who were asked for input to company explicit material were evidently aware of their stake in the process and this was highlighted in the constructs. The poor

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literacy skills of select participants excluded them from these opportunities and from participating in any explicit – explicit knowledge transfer.

### **Section 3 People and artifact links**

In each interview Part B had followed Part A in the elicitation process. Part A produced considerably more data than Part A. But this was not just more in terms of quantity but more in a sense of depth and richness. This group of participants saw knowledge epistemology highly correlated to the people issue. In Part A the elements were people and elicited constructs detailed characteristics, qualities, morals and behaviour traits of the element role titles in the context of grounds for knowledge. In the majority of instances inclusion of artifacts lead to constructions discriminating in terms of a participant's engagement and involvement with artifacts rather than properties of the artifacts. Certain patterns emerged from the data.

Those who in Part A had focused on knowledge and hierarchy were often poorly educated participants discriminating in Part B a knowledge and book connection. The ability to read and comprehend was seen to link with school days and their lack of ability in literacy. Knowledge, for this group of participants, in the context of people means knowledge and people who were controllers/managers/teachers – people who told them what to do. Knowledge was personified in management, someone who has the right to be sure (Ayer, 1956) and the opposite pole was the worker, grafter. Then knowledge in the context of artifacts was dominated by the attention to books. A



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representation of knowledge which they either avoided or felt alienated from due to primary socialisation. Books are only a part of the system for warranting knowledge (Cortada, 2001) but for those who had found books an alien territory they had become the essence of knowledge. Knowledge epistemology was construed as education and a certain primary socialisation and for this group represented by items that they considered sacrosanct but distant.

Nonaka and Takeuchi (1995) demonstrate efforts to convert tacit knowledge to explicit knowledge, explicit to explicit and explicit back to tacit. They warn of inadequacies, inconsistencies and insufficiencies of language in this process. In the case company the written documentation transfer process rarely addressed a specific recipient. Instead, it was composed in a generalised language that the writer presumed all press operators, apprentices, welders, tool setters would comprehend and choose to read. The demand of engaging with written text for each individual employee was overlooked.

Two of the participants were actively involved in further education, both part time students in a local college. Interestingly their construing of books was less favourable as they appeared to have become disillusioned with their book knowledge and found experienced co-workers more meaningful.

Others in Part A of the conversations had emphasised that they know what they know primarily due to close trusting relationships and a sense of ease and reliability. In Part B the same participants commented on a preference for in-house artifacts. In some cases this referred to artifacts already produced in-house but for others it meant artifacts they

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would have liked to have but not yet available, for example, a company newsletter. This observation supports the work of Garud and Rappa (1994) who observed communities developing artifacts that supported their own belief systems.

Technological artifacts had become part of this small firm albeit modestly. However, the impact of the artifacts can be seen in Parts A and B of the constructions of those that were required to acquire skills to use the new tools. When thinking how they know what they know this group still rated me and me as I would like to be either the same or very close. Yet change had been enforced by the impact of the technology. They saw knowledge epistemology involving specialists and training – areas they had been exposed to due to IT. In Part B they enthused about the difficulties of engagement but the satisfaction derived from any engagement. They recognised that the process of becoming adept in the use of IT impacted upon their knowing, enhancing their own capabilities (Shariq, 1998, Scribner, 1991) and the resulting change in information access affected their knowing in the firm. There was a notable difference in their Part B element selection in that books were now superseded by internet, e mail and other computing tools. However, when books were included they were still seen as more reliable than data derived from information technology.

Engestrom (1991) noted that an activity system, such as a functioning small firm, should be seen as a unified whole including the people and tools with further emphasis on shared objects. The participants that formed this unit of analysis were aware of disunity in access to technological artifacts. This may have strengthened existing constructs held by some that saw inequality and division in the firm.



As stated in the Literature Review knowledge construction can be seen as pertaining to a particular context but the precise boundaries can be blurred by external factors. How do I know what I know for some was construed in terms of the people whose company they clearly enjoyed. They were able to gossip, have a laugh and joke but at the same time these friendships led to knowledge. The same participants also used a daily tabloid newspaper and television to warrant what they know. Thus at times the warranting process needed to have an entertainment aspect.

Knowledge construction in a small firm involves the people in the firm together with the artifacts they have either developed or adopted to enable the firm to function. A number of links between the two sets of data gathered for each participant materialised. The links became apparent when analysing the data as resulting constructs for Part B had emphasised the participants use of selected artifacts rather than features of the artifact.

## **Section 4 Content Analysis**

### **Part A Knowledge and People**

#### **Introduction**

The purpose of a content analysis is to examine the constructs *of all the participants* as a holistic exercise and attempt a scheme of categorisation. It is clear that something will always be lost in any categorisation but there is value in the clearer picture that results from the reduction of themes. A valuable feedback session with a research colleague is recommended by Jankowicz (1991) but in this instance the Works Director was used to

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validate the selection of categories and the division of the constructs into sets. But in order not to breach the agreed anonymity this was completed with unidentifiable construct lists. Occasionally, in previous examples of using content analysis with grids, a research colleague has intervened at this point; however, a company participant was viewed as more appropriate to the setting.

It is important not to overlook the process of content analysis. All the constructs have been placed together and themes derived from this larger population. An individual's construct may fit with one theme alongside their colleagues but then does not fit any other apparent themes with this same colleague. The content analysis is examining the constructions of all the participants and drawing out collective themes of knowledge. Constructs in their themes can be found in Appendix VI.

The researcher was conscious that sorting of constructs does have pitfalls, for example, placing constructs into categories potentially dilutes the original intention of the raw construct. The researcher pursued preventative measures to ensure that a high degree of the original meaning was retained and not lost by forcing the construct into a category. This resulted in a selection of constructs that the researcher was unable to categorise. The individuality of eight constructs was such that they stand alone with no other constructs close enough in meaning to join them.

A second cautionary measure was the researcher's determination not to have any preconceived ideas as to the labels of the categories. It would have been feasible to use



themes from a recognised theoretical model (Honey, 1979) but this was rejected in favour of a qualitative holistic approach.

Prior to the evaluation of the categories with groups of constructs it remains valuable to examine the few that appeared unique.

### **Constructs beyond categorisation**

As stated earlier, it was essential that constructs were not forced into a category for the sake of minimising categories. Thus, this section examines constructs that did not appear to ‘fit’. Beginning with a construct that focused on memory as a knowledge discrimination.

#### *“normal memory capabilities – phenomenal memory for the business”*

This participant was alone in incorporating the issue of memory into the context of knowledge. However, the literature review highlighted the work of Sparrow (1998) and his three dimensional combinational model that represented an overall framework for classifying organizational knowledge. This included the category of ‘episodic memory’. The richness of an episode enhances the propensity to recall or remember (Sparrow, 1998). In describing an element from the triad of elements this participant felt that the element’s memory for the business was beyond what he would consider as ‘normal’. It can be expected that episodes that have a deeply reflected personal effect on the individual will be particularly richly encoded (Sparrow, 1998). In addition, an individual’s own personal situation will either enhance or constrain the individual in sharing the content of the memory.

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*“knowledge about firm is limited – don’t know the geezer”*

Due to the participant’s selection of labels for the elements and the triad presented occasionally a construct would have little contribution to offer the research. In this case ‘the geezer’ was the owner manager. In the case company recently recruited shop floor workers would have had little or no contact with some members of the Board.

*“don’t know if they like to read – like to read”*

This construct could be attached to potentially two of the categories, Academia or Learning. The participant was not specific about the material ‘read’ thus the construct could also stand alone as the reading referred to could be primarily fictional and light. It was relevant that the act of reading was seen by this participant to have a bearing on knowledge.

*“Professional – manual skilled worker”*

This construct indicates the participant has reflected on the elements position in the company and not particularly within the context of knowledge.

*“theoretical knowledge – practical knowledge”*

And

*“working knowledge – not working knowledge”*

The researcher contemplated placing these two former constructs together in a category of Utility. One participant could see a clear distinction between the knowledge that had utility and a pragmatic application as against the knowledge that he saw as static. The other participant distinguished between theoretical and practical knowledge. The term practical knowledge links with working knowledge but then if the first construct is



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examined in isolation it is not so obvious that the common theme is utility. The suggestion of theoretical knowledge as opposed to practical also brings to mind Academia. Therefore, the researcher and the Works Director concluded that neither construct should be accommodated into a category.

*“more inclined to write things down – all upstairs not on paper”*

This construct places knowledge in two possible domains. It can either be explicit and represented in a text, that is, written format or remain tacit. The participant does not imply any value judgement on either form of knowledge but was clear in distinguishing the two potential ways in which knowledge could be stored.

*“less personal approach – personal approach”*

The final construct that the researcher was unable to categorise could arguably be placed into the category of Knowledge and Transfer but it remains an example of a construct which needed “laddering” (Hinkle, 1965) in order to grasp a higher level of abstraction. The question remains as to what was meant by “less personal approach”. The image of a personal approach is one of closeness and empathy with an understanding for each others needs and abilities. Speculatively, the “less personal approach” suggested attempts to transfer knowledge without any form of rapport. The laddering of the construct would have revealed which approach the participant preferred and why. This would provide a clearer indication of what advantages or disadvantages exist for either position of this bi-polar construct.

### **Summary - Constructs Unable to Categorise**

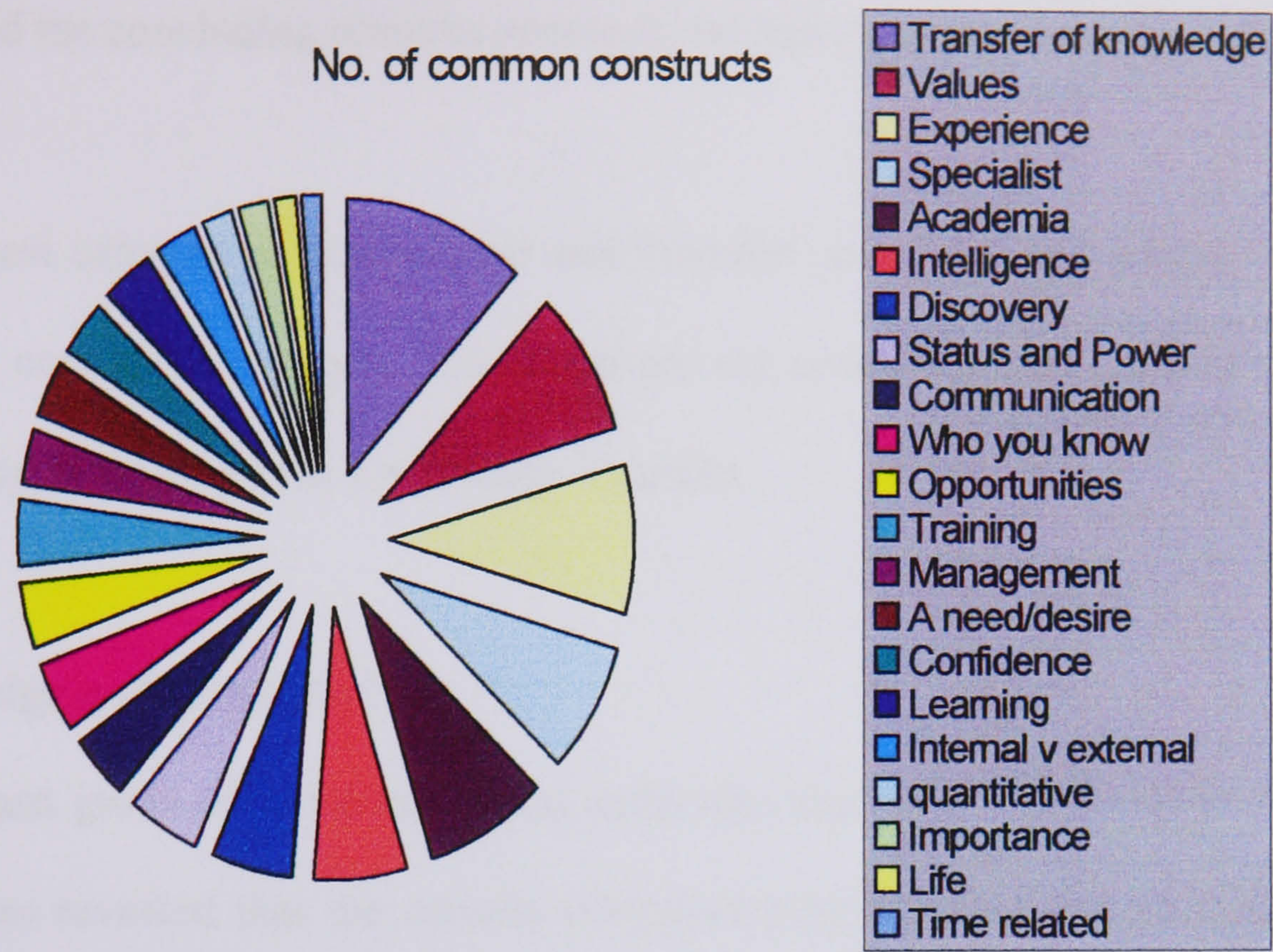
The constructs that the researcher considered would not fit into a theme or category indicated the different perceptions held by the group of twenty participants from this case company. Constructs are described as unique but this uniqueness was only applicable to the situation of this population. It cannot be precluded that another individual in a much wider population may hold a common construct in relation to knowledge and people.

### **Categorised Constructs**

The constructs were examined for common themes that would place them together. A precise label for the theme was not settled until all the constructs had been sorted. The separated pie chart Figure 25 is useful in providing an overall illustration of the variety of themes that ran through the total constructs elicited in the context of knowledge and people. This variety is not to be dismissed. An oft-held belief is that a greater degree of commonality in a group leads to improved team effectiveness (Sparrow, 1998). This proposition was now being questioned, as diversity in views is to be encouraged alongside a framing of shared pertinent issues (Sparrow, 1998). There is a growing recognition that groups can work effectively with common labels but retaining private conceptual definitions (Tsoukas and Vladimirou, 2001). It is the role of management to instigate an appreciation of these differences rather than discount or discredit them.



FIGURE 25. SEPARATED PIE CHART INDICATING RANGE AND POPULARITY OF CONSTRUCTS



This group of twenty individuals from one company were able to supply constructs that are inter-connected by a common theme but were expressed in very individual terms. The researcher always recorded the precise terminology used by the participants but checked the meaning of terms in the conversation. The constructs were drawn from participants throughout the organisation and yet in the content analysis it can be seen common themes link together all factions of the organisation.



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This particular section concentrates on extracting the themes that run through all elicited constructs in the context of knowledge and people. Each theme is discussed in greater detail and the concluding remarks approach the Part A content analysis holistically.

The largest category is 'Knowledge and Transfer' and the 'Time Related' category has the least common constructs. The constructs are now discussed by category in order of popularity beginning with Knowledge Transfer.

### **Knowledge and 'Transfer'**

The largest group of constructs came under the heading of 'Knowledge Transfer'. The interviews revealed that the activity of transferring knowledge is an indication of the person's own knowledge and characteristics. It was the single most frequently cited trait of knowledge. That is, grounds for knowledge incorporate a willingness, ability, propensity and capability to transfer what is known. Thus rather than knowing being a purely static state of being it involves social interaction. The bi-polar constructs were, in some cases, extreme: 'Passes knowledge to me – receives knowledge from me'. This construct indicates that the individual would not identify the receivers of knowledge, as contributing to this participant's own knowledge. Similarly, those who pass knowledge to this individual are not seen as receiving knowledge from the participant. This is a distinct categorisation that is not characteristic of sound knowledge management practices which encourage a consistently mutual two-way transfer.

An examination of the vocabulary sees constant references to the verb 'to pass' this is to move what one person knows to another. It indicated a physical presence and was often



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meant in the case company to mean a verbal exchange (dialogue). By passing knowledge on to other individuals the initiator does not become ignorant but the potential utility of their knowledge has expanded. The initiator is still in a state of knowing but now a colleague, customer, supplier, trainer, friend or family are also in the state of knowing what the initiator was willing and able to *pass on*.

This set of common constructs not only indicated the activity of transfer but also provided clues as to how the recipient views the manner of transfer. It generates a picture of how the participant sees himself or herself in the transfer of knowledge. People were perceived differently in terms of their ability to transfer knowledge. Thus knowledge transfer not only involves a willingness to participate but also needs to question the manner in which the individual carries it out. The popularity of the 'knowledge transfer' trait indicated the need for knowledge to be dynamic in the workplace and not a static state of being.

### **Knowledge and 'values'**

Thirteen of the constructs elicited from the employees in the case company indicated the importance of the values placed upon knowledge. Some of the 'value' constructs arose with the same individuals. This could indicate a particular need for these individuals. They wanted to be able to trust and rely on the knowledge of others. The participant's view of their element's knowledge was dependent on different moral and empirical values. They used questions of reliability, trust, utility, validity and the senses to validate the knowledge of others. As Kelly (1955) portrays this is man as a scientist.

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In the pressurised workplace the participants were in need of knowledge that met their personal critical judgement criteria (Tsoukas and Vladimirou, 2001). The management of knowledge in this firm would need to acknowledge the role of these personal considerations. For example, looking through the value constructions indicated a negative pole to many of the constructs. When the participants felt their colleague's knowledge was, less respected, unreliable, untrustworthy, and doubtful or pretence it was certain to disable any potential knowledge exchange.

In Boisot's (1998) model of knowledge in the I-Space, the problems of trust plague the lower regions, that is, personal and uncoded. Organisations seek to overcome this issue by pushing for greater levels of abstracted codified knowledge and creating a bureaucratic structure. By creating an impersonal knowledge ethos in the organisation there is less emphasis on the need for interpersonal relationships. Trust is the result of an investment by individuals/groups in other individuals/groups. This investment involves time and a suitable environment, both of which, is in short supply in the case organisation.

Trust is a crucial factor in knowledge management initiatives (Clarke and Rollo, 2001, Davenport and Prusak, 1995) and knowledge alliances (Ram, 1999, Badaracco, 1991). Without trust, knowledge willingly and openly shared will not have the desired effect. The issue of trust should be seen as a reciprocal arrangement providers and intended recipients, trusting each other. The providers of knowledge need to feel a sense of worthiness in their activity. They need to be able to trust the promoters of the knowledge exchange in that the action will receive credit and be reciprocated. The reciprocation



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element also needs to be seen throughout the internal organisation. Any imbalance in the openness of employees to participate in this knowledge exchange will lead to less efficiency.

The intended recipients in the knowledge exchange need to be able to trust in the providers. According to Davenport and Prusak (1998) this trust must emanate from the top of the hierarchy downwards. The 'value' constructs revealed disparaging views throughout the case company and this indicated that efforts to warrant knowledge in the organisation were blighted. Changing the infrastructure or purchasing further technology to press for greater knowledge exchange would prove ineffective without overcoming issues of reliability, validity and trustworthiness.

Building trust arises through improved interpersonal contact and in particular face-to-face contact. Doubtless there is a reason why elements were accused of pretending to know, telling lies, being two-faced and blinkered. These issues raise a number of questions for the organisation:

- *Do employees feel pressured?*
- *Do employees feel intimidated?*
- *Are employees insufficiently informed?*
- *Do employees feel under valued and not wish to add to their knowledge?*

Davenport and Prusak (1998, p.34) describe the trust issue as the 'trump factor' so it was relevant that in the case company these constructions of value were commonly construed in relation to knowledge.

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## Experience and Age

The term *experience* arose constantly throughout the researcher's engagement with the case company. This grouping was labelled 'Experience and Age' due to the frequent reference to the age of the selected elements. The link between experience and knowledge was not confined to the view of experience due to a person's exposure to events. It was expressed as experience particularly related to *age*. The company had a number of young apprentices/trainees and the remaining employees were considerably older. This group of participants were primarily aged under 25 or over 50. The middle age range was poorly represented in the company.

Here, constructs indicated a respect for the older employees from the participants. Their age was seen as an indication of their greater knowledge of the tasks and activity in the company. The younger employees did not appear to question the efficiency or effectiveness of the work practices carried out by the older employees. There was no questioning of the older employee's ability. There was little reflection on the part that the individual identified as the element takes in creating and organising their own experiences (Polanyi, 1962). An individual may have been witness to a number of events in their life but not made anything from them. Thus, the employee may have worked in the company for twenty years and seen many differing episodes but unless they questioned or altered their mindset the episode carries little meaning. Kelly (1955, p.171) cites the instance of a veteran school administrator who had 'one year of experience – repeated thirteen times.'



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This is not to say that an episode can take place as re-confirmation of one's knowledge. The individual may be part of an event a number of times and each time it reinforces their constructions. It is the individual's openness to change their construing that will determine the effect of experience. A person's experiences are a sum of their biography and can help account for what they know but this is not to declare what they know to be valid. The individual who is construed as knowledgeable due to their experience is likely to have validated their status and built upon a position of trust with the participant.

### **Specialised Knowledge**

Knowledge was seen to fit into categories rather than as a wholly generic state. Frequently, the theme of engineering was seen to be different. In Merton (1949) the engineer was given prominence in a discussion of social theory and social structure. Following technological advances their position in society was seen to be changing with the specialisation of engineering creating a social stratification of the workplace. In place of the general engineering apprentice there is now in some areas a demand for specialist knowledge of complex computerised machinery. This encourages individuals to specialise much earlier in their careers and lose some of the foundation of what was previously considered a thorough engineering background.

The existence of engineering knowledge still created a common ground for groups of workers in the case company. It was in a sense that above all, these people had engineering knowledge even if they did not exhibit a 'worldlier or broad' knowledge. It set them apart and in one case was seen as quite different from 'business acumen'. Individuals from outside the engineering profession own the Company and in addition

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the management outsource training professionals. The outsider's knowledge was not identified as less valuable but in a sense it was based on an alternative framework. Those who distinguish the engineering or specialist knowledge implied a sense of mutual understanding.

### **Academia and Education**

The theme of academia and education identified an equal number of constructs as the issue of specialist knowledge. The triadic elements were sorted in the context of knowledge and the participants were quick to identify a link with academia. The references to education were portrayed in terms of the secondary and higher education experience and never to more recent attainment. The knowledge acquired from one's education may be of various kinds (Polanyi, 1962) and we are not always aware of the extent of our knowledge acquired from education, until specifics are once again focused upon.

The participants were not hesitant in dividing the elements between their respective constructs. They 'knew' a person had been university educated even if this was not factual. The participants felt this could be construed due to manner, language and profession. The lack of knowledge that one of the participants had of the education system was highlighted by his claim that an element had 'at least ten degrees!'

The important point in connection with education and knowledge is that elements were not perceived as having no knowledge due to their lack of education but that some educated elements had a wider knowledge acquired from a taught situation. This facet



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still seems to set people apart and yet the education may have been experienced thirty or more years ago. Attending a higher or further education institution has a very individual effect and the knowledge gained differs from student to student. Yet, in construing knowledge the credentials of education were seen as valuable indicators of a person's knowledge capabilities.

Participants who had not enjoyed a sound education spoke of regret, missed opportunities and the frustration of hindsight. The company had an excellent record of formal *training* initiatives but this work related emphasis was not what the participants immediately linked to knowledge. It was noted in this content analysis that the 'training' theme was less common than 'education'. In the UK, at any age after the age of sixteen a person may opt for further education on a voluntary basis in a broad assortment of subjects. Therefore, due to the voluntary nature of this further education opportunity it is an individual's own need that determines levels of participation. Despite the murmurs of regret from the uneducated participants a blame or victim account was used to explain the lack of drive to educate themselves in later life.

In their 'primary socialization' (Berger and Luckmann, 1991, p.149) the significant others (parents, guardians, carers) will have shaped the internalisation of a world as the only real world. This will include the portrayal of education, schools, teachers, qualifications and further or higher education. It is only in 'secondary socialization' (ibid. p.157) that the individual can begin to doubt the real world as it was originally presented. The option of gaining an education in their adult working life is feasible but only if in secondary socialisation the individual can integrate with different bodies of

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knowledge. The attitude towards education will be embedded from primary socialisation and this may need to be tested and replaced by a secondary socialisation.

Typical, in such a company-based context the educated individuals are in positions of authority and the uneducated are subordinates. The opportunity for secondary socialisation arises in this adult working environment. In the context of a struggling automotive component company it is reasonable to see that the individuals in authority were not aiming to adjust the outcomes of primary socialisation in order to educate their subordinates. Their aim was to train subordinates in specific tasks that improve the production output capabilities of the company. Firms have experimented with financial support for employee's who wish to continue their education in *any* subject area. The case company was not supporting any such open generic scheme. Their support for training was completely directed towards task based company relevant programmes.

Importantly, it was the potential skills acquired in the education experience that perceived as an enabling factor. Empowering the individual to continue learning and thus alter the state of their knowledge. A link was also made between the education experience and the ability to communicate knowledge to others. It was recognised that a sound education has the potential to improve confidence and communication skills. However, it is only a potential and not a guarantor because other participants perceived others as knowing through education but so removed from them personally that the educated were unable to appreciate an appropriate approach to transferring knowledge to a poorly educated colleague.



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The work of Neef (1999) includes a fitting chapter on the role of education in the new knowledge economy. It particularly highlights the education systems of the United States and United Kingdom drawing comparisons with other countries. Both the US and UK are said to weight education resources to the few who are achievers and ignore the less able. Neef condemns the treatment of the large number of young people who dropout of the education system. Denmark and Finland are recognised for the efforts made to alter the education framework in readiness for a less productive and greater knowledge focused world economy. There is emphasis on literacy, vocational training and involving the business community in devising educational needs.

### **Intelligence and Cleverness**

In construing knowledge and people, nine of the collected constructs involved themes surrounding being intelligent or clever. It was interesting to note that none of these constructs were elicited from senior members of the staff. The management may have seen themselves as fitting within a theme of intelligence and cleverness but chose not to verbally construe this in relation to others. It also implies that knowledge has something to do with one's intelligence. Does being intelligent enable a different level of knowledge or a different means of gathering knowledge? Whatever, the answer to this it can be seen that intelligence is linked to knowledge. Intelligence is commonly thought of in connection with a measurement in the form of the Intelligence Quotient test (IQ). However, this is not a test of someone's knowledge it is a test of a human's flexibility in solving various problems. The IQ test has been found to be vulnerable to social and cultural factors and the test is rarely applied in any UK recruitment process.

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A widely held hypothesis is that people lose fluid intelligence as they age. This phenomenon is caused by comparing the IQ tests of elderly people with today's young people. However, when compared to the IQ scores of youth in their own era (a half a century before) the IQ losses with age are minimal (Raven, 1992). If an IQ test was carried out with employees in the case company it may well have found young unskilled labour with higher IQ's than senior management. This could be linked to the Flynn Effect (1994) which has noted a general rise in IQ across fourteen countries over generations.

Intelligence has relevance to the issue of learning, gathering information, processing that information, creating a new state of knowledge or challenging the existing knowledge. Thus the level of intelligence in the organisation can have an impact on the outcomes for managing knowledge. A highly intelligent person can find an unintelligent work colleague difficult to work with and vice versa. They have a differing level of flexibility and ability in processing information. Management needs to be sensitive to such situations.

### **Discovery and Creativity**

Knowledge in organisations covers themes of innovation, creativity and new knowledge. This is the highly respected composite of knowledge, which is seen to have an impact on company performance. The recycling of existing knowledge does have a purpose. The routine performance of knowledge operating in an existing framework is reversible (Polanyi, 1962). But the concepts of creativity and discovery remain aloft. In the selection of a label for the element 'when I say knowledge the first person you think of'



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the participants frequently recalled a prominent inventor, scientist or historic genius. Knowledge immediately meant a discovery, a hero. Something that had changed the way that humanity lived or explained the way we live. Polanyi (1962) describes the act of the inventor and discoverer as being non-reversible; they make *an original* addition to human knowledge. The steps they take to reach the discovery cannot always be traced or explained.

At a company level the participants felt comfortable in construing their colleagues in terms of their inventiveness. Being inventive requires a supporting framework. It needs the human and financial capital to exploit the new capabilities (Badaracco, 1991, p.40). The assessment of employees in terms of their inventiveness is a good indicator of a firm's knowledge environment. Nonaka and Takeuchi (1995) use the Minnesota Mining and Manufacturing Company (3M) as an example of a firm with funding and support for its inventive employees. The employees are permitted to spend up to 15% of the working time in investigative development. The employees are given a sense of autonomy and entrepreneurship to pursue new areas. The hero stories still ring round the company of two employees responsible for inventing masking tape and the Post-It Notes pad.

In the small enterprise it can be difficult to arrange for this freedom and the supportive framework. The creator requires the time, space and funding to develop ideas. A tight hierarchical structure will also limit the potential for discovery and creativity. Management within a hierarchical structure may smother or steal the work of others then the propensity to create will be even further reduced.

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Management can be reluctant for employees to ‘go in blind, experiment’ when all financial risk has to be carefully scrutinised. The participants’ constructs indicate that people may have the same knowledge but what they do with it can be very different. This signifies the importance of the individual’s anticipation of future consequences. The inventor may anticipate a changed environment due to the pursuance of inventiveness, a changed environment that is the individual’s intention and yet still predictable. The non-inventor may anticipate a predictable environment that is personally more comfortable, static and fitting.

Many aspects of the small firm environment limited the scope for discovery and creativity in this case company. Financial and productivity pressures, work patterns, hierarchy, external pressures and working conditions were just some of the many aspects that curbed potential in the case company for discovery and creativity. Employees had the capability to be creative but not the ideal environment.

### **Status and Power**

Grounds for knowledge incorporated status and power. This appeared as a natural progression from academia and/or discovery. The theme of academia related to education, university and qualifications. The qualifications were signposts for a level of attainment in a recognisable system. Alternatively, applying knowledge to a significant goal would perhaps have resulted in potential recognition.

The person who was ‘running the firm’ was thought to know everything that needed to be known to run a firm. The person who is deemed as successful is construed as



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displaying a particular level of knowledge. Their role in life 'indicates their knowledge'. The participants construing status and power, as part of knowledge were rarely in the position; or sufficiently confident, to question the knowledge of those they deemed famous, successful or powerful. The participants' constructions were based on how they anticipated these others to be.

The participants could not see themselves in these roles and thought that the knowledge warranting of people with status or power must be beyond their own personal capabilities. It brings to mind the idea of knowledge as a possessive competitive element. The more knowledge you have the greater the chances of success.

The media are frequent communicators of the '*knowledge is power*' adage. What categories of knowledge lead to greater opportunities of winning status and power in the knowledge economy? There are specific areas that the population recognises as valuable knowledge and other knowledge domains remain ignored. In recent years employees engaged in information technology have been highly financially rewarded. However, there are numerous examples, in all areas of life, of contradictions to this construction.

### **Ability to communicate**

This theme combined frequency and method of communication. The positive aspects of communication were openness and directness. It was commonly agreed that the good communicator does not conceal information, does not deviate and is frank. Communication skills are now recognised within the education system as a vital component of the education process. With few exceptions the employees in the case

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company would not have benefited from this new education approach and have had to teach themselves communication skills so vital in a workplace social context.

### **Its who you know, not what you know**

One of the key constructs under this theme came from an unskilled power press operator. The construct, 'knowledge has become social – knowledge starts from within' provided an indication of the depth that the participants were contributing to the research. This construct took some time to be offered in the interview, as it was clear to the researcher that the participant wanted to phrase the construct precisely. The term social was used to imply the social process added to the knowledge. For some, grounds for knowledge starts within the individual as they personally combine and test information. As their confidence in their personal knowledge expanded they shared it with others. This view fits particularly with Boisot's theory of the movement of knowledge in the I-Space. Knowledge loses its highly personal idiosyncratic qualities and gains in generality (Boisot, 1998). However, Boisot goes on to describe the reverse notion of this theory which recognises that the general can also move back to the personal.

The individual versus the social was also suggested by the construct, 'tap into their knowledge – knows a man who can, not an expert themselves'. In this construct the participant was using the 'their' to mean the individual. The individual was seen to know very little contrasted with the individual with a wide network of individuals willing to share their knowledge gains. This wide network of individuals needed to be the 'right' people, that is, people who effectively communicate the desired knowledge.



It was clear that knowledge was connected to the social roles that people play and the gathering of knowledge was enhanced by these social relationships.

### **Opportunities/chances**

This construct group labelled *Opportunities/chances* was not essentially related to working environment. The participants recalled their personal biographies. The individual's social position was seen to play a part in their knowledge status. Thus, in spite of a UK socially supported education system a public library system, legislation covering all manner of personal discrimination there still exists a perception of social fit dictating knowledge. This social fit begins at birth with the 'significant others' (Berger and Luckmann, 1991 p.151). The primary cognitive learning that takes place in the early years of a child's life is inscribing a representation of the world. This representation has become embedded in the social dialectic, attitude and beliefs of the significant others.

The symbolic meaning of the significant others was denied by Kelly (1955) who optimistically preferred to see everyone as having opportunities and chances and not as victims of their biographies. In secondary socialization a child may realise that the world reality accorded by parents may not be the only representation. This realisation may create disturbances for the child and significant others (Berger and Luckmann, 1991).

It was noteworthy that this theme appeared in constructs across all functions in the case company. Two participants considered themselves fortunate having experienced primary

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socialisation that focused on knowledge. Four other participants regretted the lack of direction received.

### **Training/Instructing**

The low profile of training and instructing in the context of a knowledge conversation was a disappointment for the directors. The company had spent a considerable sum on supporting training initiatives that they saw as enhancing the employee's knowledge. Three of the constructs identify ability to train as contrasted with participating in training. Two constructs merely suggest those that have or have not been trained. Finally, one construct identifies training as specific. It has become clear from this analysis that grounds for knowledge involves far more than the authoritarian, control and learn practise associated with training. A training scheme has a purpose but it cannot be relied upon to enhance the knowing in the organisation.

Training and instructing has advantages in transferring skills but does not encourage the socialisation of new knowledge. The purpose of a training scheme is not to gather individuals together to question and debate the training theme. It is the transfer of a particular skill from an 'expert' to others. It was noted that one construct identified trainer versus trainee and was not complimentary about the trainer.



### **Managerial Knowledge**

A suggestion that knowing how to manage others was a particular component of knowledge warranting came from individuals not in a position of senior management. You know what you know because of management ability reflects once again the status and hierarchical constructs surrounding a state of knowing. Within the unit of analysis the '*know how*', to manage was not evenly distributed. The participants viewed some individuals as having the know how to manage whilst others were not seen as managers.

### **The need for knowledge**

This next theme in the context of knowledge and people opposed management and placed the individual in a control position, able to expand or ignore further knowledge opportunities. Participants sensed that we all have an automated on/off approach to knowledge acquisition and expansion. Thus participants were able to identify others as either stubborn or unwilling to alter their knowledge state. Much of the knowledge management literature prefers to believe that we are all striving to continue ad infinitum with knowledge. However, some individuals identified by research participants displayed an unwillingness to alter their knowledge state in a particular context, for example, in their daily tasks. Berger and Luckmann (1991) see the daily task as part of a secondary socialization process that can lead to minutiae of change. Each activity, every conversation and every engagement with the world may affect the state of the individual's reality. We are constantly seeking confirmation of our primary socialization but if sufficient evidence is presented then we reinterpret our reality. The need or drive is not individual at all in fact it is society based (Berger and Luckmann, 1991). Kelly

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(1955) commented that man like some inert object, is neither pushed nor pulled by motive and stimuli to act. Instead Kelly prefers to think that we are merely getting on with living in a social environment. The individual may not intend to change a construct but the experience of engagement in the world decrees that change occurs.

We make choices between various options dependant on how we anticipate outcomes. Thus even if as an individual we intend to maintain our reality or live with unaltered constructs it would demand that everyone around us cloned constructs and shared precisely the same reality in a completely static state of being. As our world is dynamic then as individuals we are always given the option of changing constructs to validate them. Facing the choices will validate or invalidate what is held as the constructs of reality.

An alternative dimension to this 'Need' theme can be linked to the 'Learning' section. Looking closely at the 'Need' constructs a certain language pervades, 'take in', 'built themselves' and 'to gain'. Constructs indicated that participants identified those who appeared to be actively learning and those who were less revealing.

### **Confidence**

Research into particular personality traits influencing the grounds for knowledge is minimal. Sparrow (1998) examines the personality needed for future managers but the comments have not encompassed all employees and contradict the constructs of the participants. They see the ability to be confident as positive in knowledge appropriation and transfer. The participants cited examples of their own lack of confidence impeding their knowledge state.



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*"I wanted to know but was afraid to ask"*

*"I knew a lot about the subject being presented (more than the trainer) but don't have the confidence to comment"*

Yet, Sparrow recommends a toning down of any extroversion, the readiness to respond and a learning of introversion.

The last construct in this section provided by a power press operator was another good indicator of the richness of the data. Reading the literature the researcher would never have considered nervousness as a composite of knowledge. This revealed an individual who would struggle with the reconstruction of her world; it would create a difficulty that the company may not be aware of. The participant could be attempting to use a repertory of impermeable constructs that are irrelevant to the current working environment.

## **Learning**

The theme of learning was earlier related to the 'Need' theme where it was evident that participants could identify those who appeared to add to their knowledge and those who are static. Once again this section also implies that knowledge is linked to learning but it has a stop/start facility. There are two constructs that use 'still learning' compared with passing knowledge on and knowing what one is talking about. This suggests that the participants viewed others as reaching an optimum state of knowledge where they stop learning and instead begin to transfer what they know. This inertia in learning (Boisot, 1995) highlighted in the literature review is based on a linear view of the world. The recommended alternative encourages us to see the world as at best in the form of hypothetical structures and always subject to change – thus continuous learning.

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The case company could not be described as engaged in organisational learning (Chaston et al, 1999) although it has accomplished recognition for the supportive training of staff. The concept of learning was isolated to selected individuals.

The 'Learning' constructs also inform three methods of learning – *watching*, *study* and *reflecting upon mistakes*. They all appeared to relate to the work environment. Nonaka and Takeuchi (1995) in their case example of the development of a bread making machine from the Matsushita Electrical Industrial Company refer to a software engineer learning from *observing* a master bread maker. It was thought the tacit knowledge gained from observation improved the mechanical design of a kneading process. The *study* method links back to comments made previously under the 'Education' theme. The final method stresses the value in learning from mistakes and the evolving management theme of reflexivity.

Organisations find mistakes costly and therefore do their utmost to operate efficiently and effectively however, mistakes still occur. The only benefit to an organisation can be that something is discovered due to the mistake. The discovery can be as minimal as employee 'A' not fully understanding a task and the task then takes longer or fails to produce satisfactory results. Thus a mistake can act as an indicator. However, it is essential that those involved in the error have the time to reflect on the occurrence. Without this time the full extent of the cause for the error may remain hidden. Unfortunately, in a small component factory with a busy production line any mistake had to be quickly rectified and there was no evidence of investment in reflective time.



It was noted that some of the participants were engaged in learning situations outside of the work as part of their home/social life. Also a number of participants were acquiring adult literacy assistance supported by the case company. A final point on this section concludes that considering the interest and publicity extended to the 'Learning Organisation' it was surprising that so few constructs indicated a link between the meaning of knowledge and learning.

### **Internal and External Knowledge**

Business literature agrees that links with the external environment has a positive effect on the knowledge held internal to the organisation. Some of the literature emphasises the use of key knowledge workers who act as networker and transmitter of externally founded knowledge.

The Elements section within this Findings chapter stressed the difficulty many participants had with naming key external informants. The shop floor based employees encountered few individuals outside the case company location. The need for small firms to exploit the use of external informants is noted across the literature and yet the case company appeared to rely on only a modicum of external exchange. Once again this was partially due to severe resource constraints but also a short-sighted approach across the supply chain. The case company supplied three original equipment manufacturers (OEM) where transferring knowledge would be in everyone's interest.

### **Knowledge as being quantifiable**

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The theme of a quantifiable form of knowledge has little meaning to the notion of knowledge other than to question why participants felt they could measure another person's knowledge. Here, the interest in quantity appeared to over-ride any appreciation of quality or relevance. Knowledge management should not be adopted by a company in order employees should know *more* or *less* but to improve reflection, utility and sharing of what is known.

### **The “importance” of knowledge**

This theme indicates that contrary to quantity there were other participants who considered that particular knowledge made a substantial difference the world. With one higher construct looking at the knowledge of some individuals being so critical it could mean life or death. For this individual, who was referring to medical science and the health profession, this was a sector at the pinnacle of all other knowledge.

### **Life Knowledge**

The term of ‘Life Knowledge’ fits very well with the previously mentioned primary socialisation from Berger and Luckmann (1991). We are born into the reality of a particular world as constructed by our immediate family and surroundings. All other aspects of reality later interfere through the secondary socialisation process, school, college, university, and work.



**Knowledge is time related**

The knowledge that was once passed down from generation to generation invariably loses its impact as the social and physical situation becomes further removed from the utility of knowledge. The researcher still recalls how to start a vehicle with a starting handle. This knowledge now appears to have little use and would only have some meaning amongst classic car enthusiasts. It is not anticipated that the social world will return to the technology that demanded the occasional use of a starting handle thus a smaller percentage of the population will be in a state of knowing. The knowledge becomes particular.

Knowledge is dynamic and moves from the minds of the employees into the documents, products and culture of the organisation. It is in these representations that knowledge can become hoarded and inert. Some participants in the case company considered knowledge as historic. It could be discriminated on the basis of 'old' or 'new'. The very instance of transfer creates a revised state of knowing for the transmitter and receiver of the message. The *information* codified and represented remains in a static historic state but any knowledge of this information is dynamically contextual.

***Summary of categorised themes***

The content analysis successfully reduced one hundred and fifty individual constructs to twenty-one themes and thus created a more distinct picture. The number of themes was a suitable reflection of the common constructs and had not extensively reduced the meaning for the individual participants.

It is important to emphasise that any common link through the constructs would not equate to a common experience or a common knowledge that resulted in these similar themes. The theory of personal constructs is a forward thinking analysis and does not dwell specifically on a person's history. This is what the participants were using to view their world *now* and that is of significant value to management aiming to manage with perception (Sparrow, 1998). That is, manage with respect for different stakeholders, disparateness, ambiguity, subjective position and type of thinking (Alvesson, 1993). Management needs an insight into the perceptions of others avoiding the traditional line of management that focuses on logical, rational, decision outcomes rather than a people-centred process.

It was relevant that those individual participants used these common constructs to view their world. The common themes were particularly weighted towards transfer, values, experience, specialist and academia, involving forty five per cent of the total constructs. In thinking about grounds for knowledge and people the participants were conscious of others who were actively engaged with passing on their knowledge. Linked to the transfer of knowledge was the next most commonly held theme of the values involved in this transfer. The participants highlighted trust, validity and reliability.

Knowledge transfer prospects were enhanced when the level of trust was secure. Trust appeared to be associated with the closeness of a particular social relationship. The participants also stressed the significance of experience. The confidence in a person's knowledge was heightened by the length of time the person had been engaged in the task. Significance was also placed upon the specialist nature of engineering. It was seen



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as a domain that also encompassed a particular attitude, culture and approach to knowledge related to the whole career profile within engineering. Lastly, academia was clearly a prime component in grounds for knowledge with this group of participants. In management literature employee's academic experience is suppressed and yet in the case company the topic was dominant.

The complete content analysis illustrated the multi-faceted character of the knowledge and people question. The summary has re-iterated the more popular themes, however, some of the greatest insights are also provided by the construct themes that can be overlooked due to their subordinate placing in the analysis. For example, the implication of the 'confidence' theme and the unexpectedly positioned 'learning' also have a bearing on attempts to understand grounds for knowledge in the small firm.

The management in a small firm can derive tremendous insight from first questioning what the commonly agreed themes are and what other themes reflect grounds for knowledge. It is apparent from this content analysis that knowledge warranting denotes far more than information processing. The knowledge constructions of employees were part of the secondary socialisation process that are quite distinct and in many cases challenging to the primary socialisation of childhood.

## **Part B Knowledge and Representations (artifacts)**

### **Introduction**

As in Part A, the content analysis was conducted individually by the researcher with a feedback session with the Works Director to validate the selection of categories and the division of the constructs into sets. Once again, in order not to breach the agreed anonymity this was completed with unidentifiable construct lists.

The previously elicited individual constructs for each participant were written on a card. The researcher, working alone, spread the cards out on a large surface and surveyed the data. The researcher looked for homogenous or common themes to form a category. The cards were then sorted into the categories. The eight categories are displayed in Figure 27.

Elements in Part B were volunteered by the participants and not supplied labels as in Part A. The earlier section in this Findings chapter comments on the choice and selection of elements. The researcher feels justified in completing a content analysis with constructs derived from an assortment of elements because the elements all fit within a recognised range. Taken from Personal Construct Theory, the *Range Corollary* states that a construct is only convenient for the anticipation of a finite range of events. All of the elements volunteered have a recognised contribution to the knowledge appropriation process. Thus the researcher feels secure in comparing the constructs from



this particular group, which were volunteered in the context of knowledge artifacts. The constructs would not fit within the range of convenience in the context of how people know what they know. For example, the construct, ‘means of immediate communication – a reference tool’ is not compliant with knowledge and people but would make sense in the context of knowledge and artifacts. The researcher did not to have any preconceived ideas as to the labels of the categories (Honey, 1979). As in Part A it was essential that the constructs that did not fit a theme were not precluded from the analysis.

A direct comparison of the themes with Part A is not explored as the researcher feels this will be methodologically flawed. The constructs were drawn from completely different set of elements and the comparative value is therefore meaningless. However, the researcher considers it notable that a greater volume and variety of themes were compiled from the Part A constructs than the Part B. The construction of knowledge in social relationships produced greater diversity than construction of knowledge in relation to inanimate objects.

### **Constructs Unable to categorise**

The constructs detailed below did not neatly fit with any other construct and remained individual.

*“always in a certain place – can be wiped off”*

This participant was referring to the feasible deletion and changing of data from the computer. The conversation revealed the concern the participant had for this occurrence. The participant had a preference for data that was in what they perceived as a fixed

printed and published format. The construct could possibly be linked to the validity theme but it stood out as more of a trust issue.

*“all about work – it’s not work”*

The participant distinguished particular forms of explicit knowledge as being either work or non-work related. Further laddering of this construct may have revealed greater depth as to the participant’s preferences and why these preferences are held.

*“regularly use – occasionally use”*

This construct offered little to the analysis but was of interest to the participant. There was a realisation that some of the elements volunteered could be referred to more often.

*“does not provide local news – provides local news”*

Once again this construct appears particularly personal to the participant. They enjoyed reading and learning about local issues. They notably recalled instances of the case company and the specific sector’s local media exposure.

*“it’s there in front of you – can misinterpret”*

The continuing appeal of sense data was demonstrated by this particular participant’s construct. This employee was adamant that ‘seeing is believing’ was preferable to relying on somebody else. They wanted to witness and experience an event in order to accept it.

*“gives you the basics – gives a better understanding”*

This participant felt they had a priori knowledge as to whether a particular representation would assist in understanding. They distinguished where to look for depth amongst knowledge representations.



### ***Summary - Constructs Unable to Categorise***

The above constructs would not fit neatly into any of the themes derived from the remaining constructs. This may have been related to the individual choice of elements. Eighteen elements were unique, some seen to be closely related, for example, files and goods-inwards files were of a like format. Trace Card and Works Orders were also similar. However, a radio and personal diary stood out as individual.

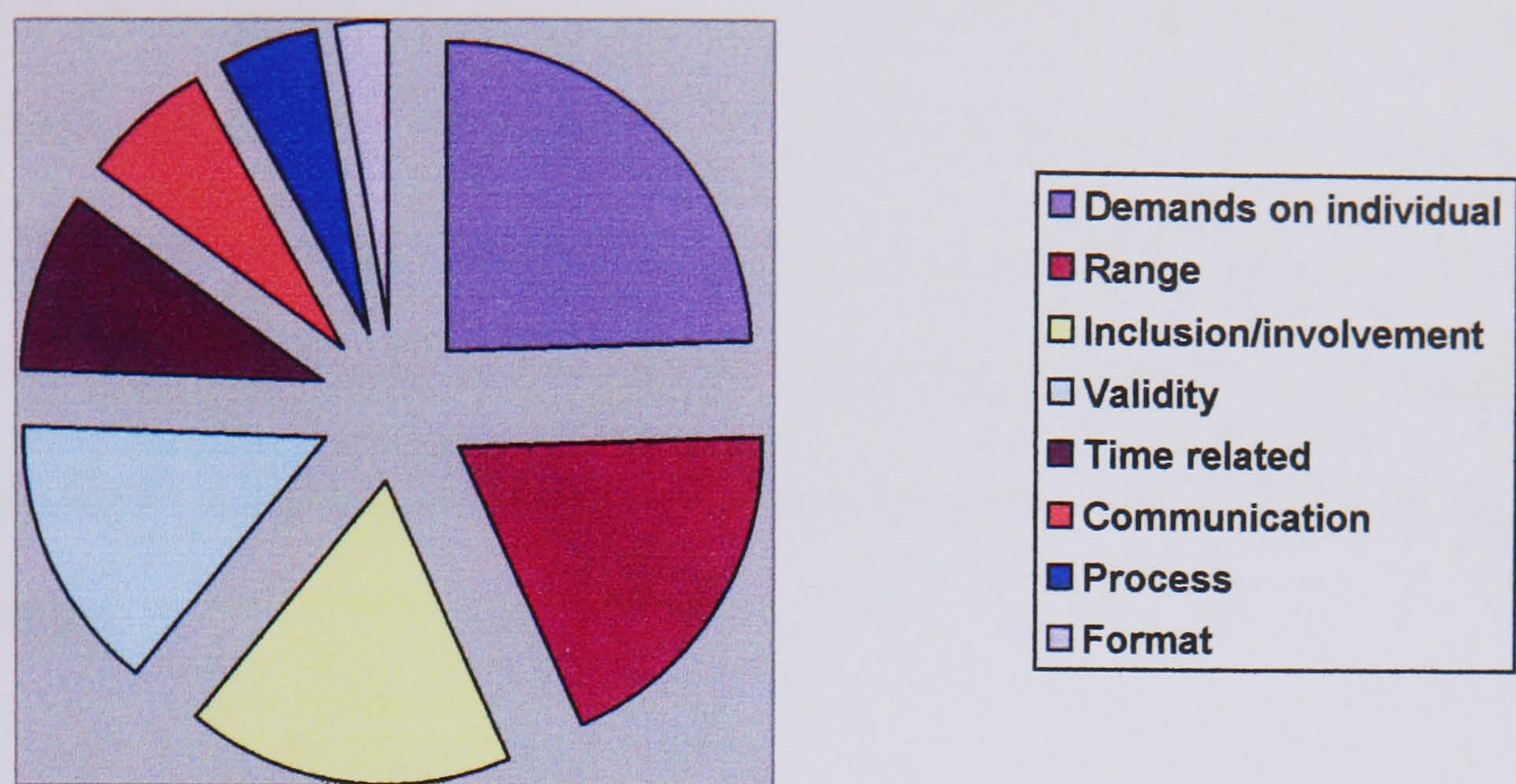
### **Categorised Constructs**

The constructs were examined for common themes that would place them together. A precise label for the theme was not settled until all the constructs had been sorted. The separated pie chart Figure 26 provides an overall illustration of the variety of themes that ran through the total constructs elicited in the context of explicit knowledge representations. As in Part A variety is not to be condemned. The constructs were drawn from participants throughout the organisation and yet in the detail of the content analysis it can be seen the common themes link together all factions of the organisation.

The largest section is devoted to the Demands on the Individual and the least common of the constructs highlighted Format. It is noted that three quarters of the pie chart is expended by four themes – Demands on the Individual, Range, Inclusion/involvement and Validity. All of the themes are now examined in greater detail.



FIGURE 26. SEPARATED PIE CHART INDICATING THEMES AND POPULARITY OF CONSTRUCTS



**Demands on the Individual**

Artifacts come in many formats and each places different demands on the employee or manager. Sparrow (1998, p.52) notes, ‘In fact there are large differences in the computational requirements of alternative forms of representation’. In order to communicate, the case company management gave due consideration to the difficulty many of the employees had with literacy and utilised diagrams and photographs in some areas. The use of some of the visual representations (also recommended by Sparrow) was restricted due to the lack of relevant knowledge and resource constraints on management.

The constructs illustrate the choices that individuals can make when faced with the opportunity to alter the state of their knowledge. The bi-polar constructs cannot be viewed as a positive or negative dichotomy. The construct, ‘have to commit time to the



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medium – can get up and walk away’ does not mean that the participant saw getting up and walking away as a positive move and the preferred choice. The participant could anticipate a development of his construct system, which may either replicate or modulate what was known. The participant would need to anticipate some sort of gain from the experience, in that the knowledge has validated existing constructs, for the individual or a gain in that the knowledge has challenged those existing constructs. The anticipated result affected this participant’s willingness to engage with particular representations.

### **Range**

The participants were able to discriminate between the volunteered elements in the context of the range of knowledge the items offered. There were certain representations seen to offer a limited specialist field of knowledge whilst others offered a much broader and expansive choice.

The use of Information Communication Technology (ICT) in the case company was limited and given much greater resources the company could expand in this domain. The explicit knowledge; predominantly manually represented, was distributed on a role basis. That is, certain employees were handed a particular item dictated by their task in the production and operation of the organisation. The physical layout and restricted area of the shop floor would limit the installation of any ICT. The suggestion that ICT could improve knowledge transfer and awareness in the case company is tempered by the researcher’s knowledge of the existing environment. Therefore, any introduction of ICT would be an enormous change for the employees and need delicate and monitored

experimentation. It is still held that ICT has a part to play in knowledge management but it is not in itself the optimum tool. So much tacit knowledge is difficult to convert to data and complacency blights many ICT systems (Davenport and Prusak, 1998).

The management controlled distribution and exposure to information, on a need-to-know basis. It is recognised that selective distribution is bound in tradition, culture and routines. For example, a specific representation would be seen by the bookkeeper and not by the shop floor employees (with any informal transfer of knowledge from this domain reliant on gossip and hearsay). The nascent knowledge management literature supports abandoning top-down management as it is seen to transfer specific explicit knowledge and limits the movement of tacit knowledge in the firm. However, this is not suggesting that all explicit knowledge should be diffused throughout the firm. The decision as to where knowledge is situated in the firm is also a pragmatic one. It is linked to both the codification of the explicit knowledge and additionally the socially constructed context. The wider the diffusion of explicit knowledge the less complex and detailed the knowledge will become. The management's decision to diffuse knowledge on a 'need to know' and specialist basis is ensuring the operation is kept tightly framed and suffering bureaucratic control (Weber, 1947).

This contrasts with the 'Requisite Variety' proposed by Nonaka and Takeuchi (1995) which recommends a wide diffusion of information across all levels in the firm. The response to 'Requisite Variety' from Chrysler could be seen as their Book of Knowledge, using the participant's constructs, it reportedly contains – 'vast knowledge', 'gives information on everything', 'provides information from everywhere', and 'covers



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everything'. However, as stated in the Literature Review effects of this management tool have not been fully researched.

### **Inclusion/involvement**

Following the argument made by Polanyi (1962) all knowledge *involves* the individual. It is the individual, who will choose to alter their manner of construing, as they perceive fits within their social environment. In the realm of explicit knowledge some participants noted their involvement or inclusion with the construction of the explicit knowledge. Input from employees is vital to encourage a knowledge enterprise. Garud and Rappa (1994) have shown communities develop artifacts from their own belief systems. However, this is not a simple process as eliciting knowledge and transferring it to others is a complex issue.

Management needs to recognise the contribution that the employee is making to the knowledge in the firm. Management also needs to devise methods of enabling the contribution to take place. This requires a strategic sense of oneness, a common purpose a shared meaning but above all the 'redundancy' that permits individuals to exploit their knowledge. Employees constantly working under pressure in a limiting environment are not going to contribute they are going to *hoard*.

Included within this theme of inclusion is also the opposite notion of exclusion. Many of the listed constructs depict the *hoarding* that was taking place in the case company. The inclusion construct depicts an environment that is healthy and collaborative whereas the hoarding or exclusion describes a fragmented inert state. There are many reasons why a

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collaborative knowledge environment is difficult to develop in small firms. There may be a history of command-and-control management initiated by the owners. The job structures and reporting lines limit employee's freedom to comment. The employees' written communication skills may be weak and their confidence to converse with superiors limited.

The advantage of a collaborative process in the development of explicit representations is the heightened interest and sense of oneness that can result. The case company had minimal collaboratively formed documentation. In addition the accessibility to existing representations was impeding knowledge-sharing in the company.

### **Validity**

The situation of the theme of validity in the pie chart indicates it was not as critical as expected in the context of the representations of knowledge. The first theme 'Demands on the Individual' would signal that the participant's prime concern was how the engagement with the explicit knowledge affected them and then of less pressing concern were questions of validity.

At this point it is worth revisiting the research method. The participant was asked to volunteer elements they used in knowledge acquisition. Using the triad method the elements were presented on cards in threes. From the three one was selected as different in terms of X and the other two were described as Y, thus providing the bi-polar constructs.



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Looking now at the resulting bi-polar constructs it is clear that particular elements are not considered as reliable and valid as others. The effect these elements will have on the participant is different to those elements that feature towards the opposite end of the bi-polar scale. One construct draws together the previous theme of inclusion and this validity theme, 'not produced by our company people – somebody in the company has drawn it up - so it must be fact'. This participant showed a particular preference for all explicit knowledge elements that were internal rather than external. His argument was that the employees all had to work together and therefore nobody would communicate something that could not later be verified. Therefore, all employees would do their utmost to be accurate and truthful. Bhatt (2000) suggests the practice of *meta-dialogue*, a discussion to validate and support what could be the case. It requires employees to openly consider the questions of what they know and how they know without clever persuasion tactics, winners and losers. Management are asked to promote a tolerance for others which has to be lead by the management's own behaviour.

Just one participant has involved the notion of belief in the construct, 'I would believe it – don't believe it at all'. The literature review highlighted various views on the state of affairs when one uses the term knowledge. Many have compared belief with knowledge, adamant that believing is not the same as knowing. If we proclaim to know something then upon reflection we would know that our state was one of knowing. Whereas, to proclaim we believe something, upon reflection the condition would clearly be one of believing and not knowing (Griffiths, 1967). What is relevant to this participant is whether they act upon their justified belief. The participant did not believe the editorial of a newspaper but did believe everything he read from the works notice board. This

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would suggest that the anticipatory state of his constructs after reading the notice board were reinforced by events.

### **Time Related**

The participants noted that elements provide knowledge of the past as well as the present. Once again, it is emphasised that the participants were not stating a preference but a construction that discriminated between the elements. For example, technical books were commonly seen as historic in contrast to the trade journals that provided the current news and views. Interestingly, the Directors had access to the current monthly trade journals and the previous back copies were left in the works canteen for the employees to peruse. Notably in the volunteered elements it was only the directors who volunteered trade journals as explicit representations of knowledge.

The challenge for management is anticipating what knowledge to elicit and maintain when there is so much knowledge in any firm. The transfer of tacit to explicit knowledge has a price and decisions have to be made as to what knowledge is sufficiently valuable that it needs archiving. Management who may have experienced the utility of an archive are potentially greater promoters for the archive process whereas those who only construe archives as the storage of dead data are unlikely to promote its compilation. Bhatt (2000) was critical of experience derived from '*book knowledge*' seeing this pre-created knowledge as losing relevance over time and inappropriate in different contexts. An archive of employee experiences, practices and problems can also suffer the same disadvantages.



The case company Works Director held weekly discussions with the shop floor employees to air topics of current concern. This was a sound attempt to work collaboratively in overcoming customer difficulties and company concerns. It was noted that official written records of customer complaints and responses to the difficulties were not compiled. The problem was investigated at the time and then the issue resolved and removed from the agenda. There is some sense in this as a record of a customer complaint in, for example, 1998 has little meaning in 2002. All internal and external variables are likely to change in four years so how relevant is a similar complaint?

Even when looking at positive developments in a firm, the effect of time cannot be ignored. Companies that have concentrated on the elicitation and storage of core-competence data can also suffer from the complacency that this brings. The firm will be functioning on the explicit knowledge that was relevant but is not so reliable in the chaotic present day climate.

### **Communication**

The *Communication* theme has links back to the earlier *Inclusion/involvement* theme.

There are certain explicit representations of knowledge that enable an input from the employee whilst others 'do not react' or act as a 'reference tool'.

### **Process Involved**

Three of the participants supplied four constructs that recognise that some explicit representations demand more than the familiar skills the participant already possesses. Therefore in the actual process of accessing knowledge participants need to learn a new

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skill. Their knowledge is expanded two-fold, in the process and in the results of the engagement.

### **Format**

Just two participants construed explicit representations of knowledge by format. In one case this was a simple discrimination between electronic and hard copy data. In the other, it was either hard copy data or in a format that can be lost. This latter construct reflected the participant's experience with computerised data storage and a distrust of the technology.

### ***Summary of the Categorised Themes***

The elements that were volunteered by the participants such as books, instructions, work sheets, machinery manuals are too often referred to as 'knowledge' but they are really the tools for inquiry and *representations of knowledge* (Clancy, 1995). The findings from this content analysis have emphasised that knowledge is people-centred even in the conversations concerning representations of knowledge. The participants' prime concern was the demands made on them by the engagement with the representation. For some a particular engagement would be considered more time consuming or challenging but this was not in an uncooperative negative sense. As 'knowledge' derived from the engagement was not the issue it is the process by which the engagement comes about.

Seven of the eight themes that developed from the content analysis linked back to people issues. The eighth theme, 'Format' is considered the only theme that purely describes the representation.



In a knowledge sharing and knowledge aware environment, ideally, the firm seeks to ensure knowledge is in the right place. This 'right place' does not mean the construction of some representative library or web based Intranet but in the heads of the employees. It also does not mean specialised knowledge in specialists' heads, contrary to Dover (1999). When specialist knowledge is identified then accessibility is vital to maintain the collaborative knowledge network. The 'Range' theme made the clear distinction between specialist and broad representations. The specialist domain is acceptable on the condition that knowledge of the specialist is in the general domain but it can still unfortunately breed hoarding practices unwelcome in a knowledge-sharing culture.

The commonality of the 'Validity' theme is a promising issue in relation to knowledge. The participants are conscious of a scientific scale of what it is to be 'truth'. They were aware of particular techniques that would help them to decide. However, they did have individual views within this 'validity' theme. For example, for some, appeal of the printed published word remains a notable factor in the 'Validity' theme. There was still something about a book that gives it credibility. Yet, books take time to be written, edited and published thus can suffer the vagaries of the 'Time-related' theme. Yet for others, validity was a personal face-to-face trust issue and less dependant on the impersonal printed word. The tendency to openly ask a colleague 'how do you know' has not been explored by this research. Funes and Johnson (1998) promote the utility of such analytical thought in the workplace regardless of work classification. The theme of 'Validity' was not construed by all the participants which suggested that not all participants were conscious of the need to analyse new knowledge opportunities.

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The theme that has great consequence for management and was also commonly highlighted by the participants was their 'Inclusion and Involvement'. Knowledge in organisations suffers under a top-down bureaucratic structure that precludes and ignores the knowledge of all employees. The case company has a long-standing and culturally relevant structure. The Works Director had attempted to make some changes to the work patterns and reporting lines. He had also instigated greater opportunities to communicate with colleagues. These breaks with tradition had not been supported throughout the case company and a sense of oneness did not prevail.

In summary, the popularity of explicit representations was primarily due to their effectiveness as providers/communicators of *information*. The knowledge that they represented had been elicited and tailored to fit the constraints of the delivery method. The meaning derived from the constructions in this context of knowledge and their inanimate representations emphasised the human association. In this small firm explicit knowledge was available but employees did not necessarily anticipate any gain from engaging with artifacts. Notice Boards were ignored; trade magazines left unread, works manual only occasionally referred to. Just because impersonal knowledge exists it is no guarantee that it reaches those for whom it was intended. Finally, it was noted, impersonal knowledge that reaches an explicit form has been designated 'useful' by management. Hierarchy in knowledge exchange was evident.



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## Section 5 Knowledge Icon

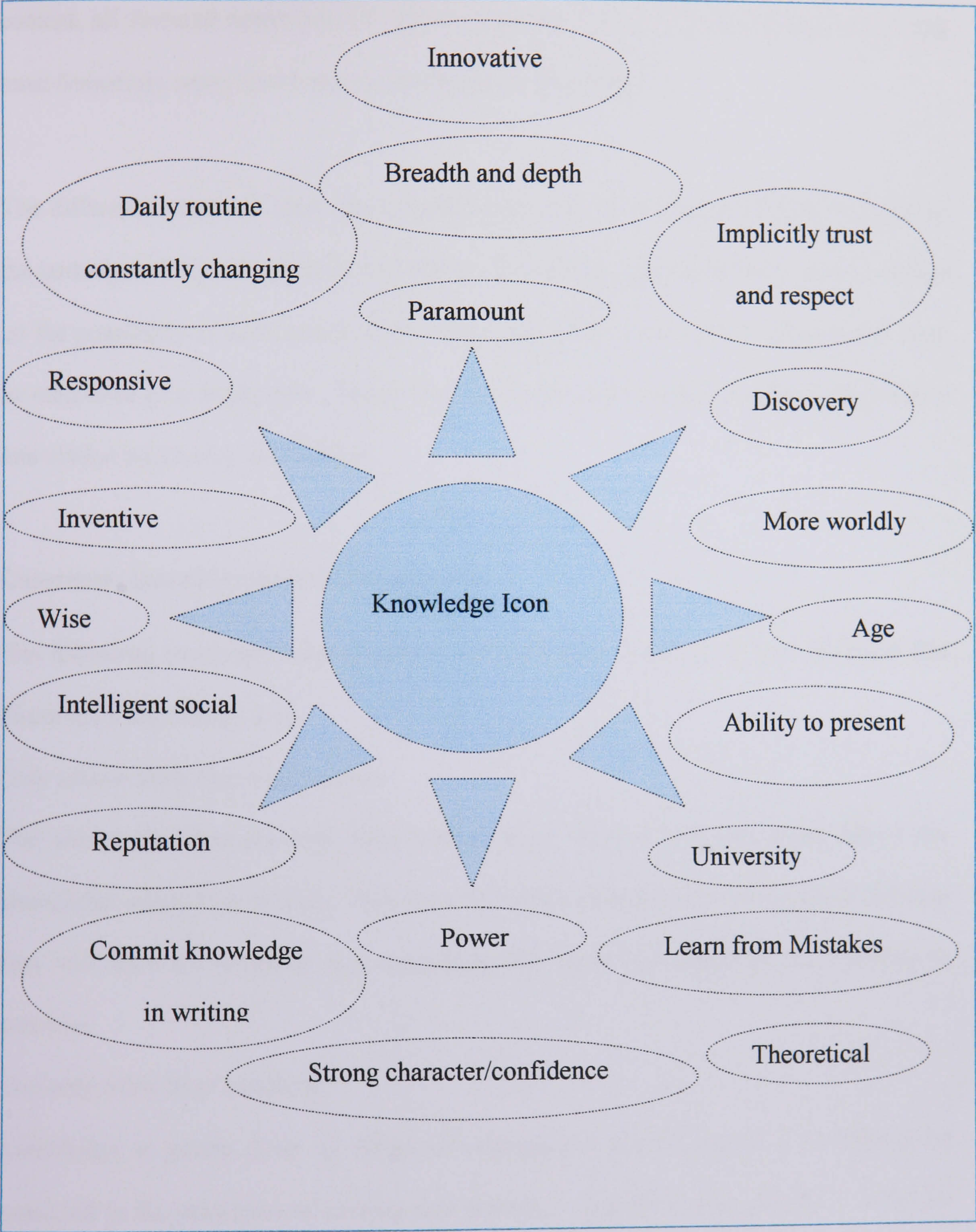
### Introduction

The over-riding theme of this research aimed to improve our understanding of how employees in a small firm construe knowledge. The participants were asked to think of an individual (Element 1) that would best fit the description ‘When I say knowledge the first person you think of’. This individual summarised everything knowledge means, referred to here as, *a knowledge icon*. The research method called for the rating of the elements on a scale of 1 – 7 depending on which end of the bi-polar construct scale the element appeared closest. This section is valuable in that it focuses on the construct discrimination that appeared most relevant to Element 1. Also in the true spirit of repertory grid, this section also encompasses an examination of the bi-polar difference construction. Referred to by Tsoukas and Vladimirou (2001, p.977) as ‘splitting the world into “this” or “that”’.

In this appreciation of how participants know what they know it is useful for management to picture what characterises how a knowledge icon knows what they know. Realistically, reaching a true consensus on this point would be challenging and difficult to sustain. The map in Figure 27 diagrammatically represents the findings of the notable constructs that were used to discriminate the participants’ ‘knowledge icon’.



FIGURE 27. DIAGRAM TO REPRESENT THE CONSTRUCTS DISCRIMINATING  
ELEMENT1





They are not presented in any hierarchical format, as ranking of the constructs was irrelevant. In order to satisfy the knowledge discrimination of participants in this group context, all featured constructs are equally relevant. Those, construct themes occurring most frequently were, trust/respect, confidence and breadth.

The difference construct from the constructions detailed in Figure 27 discern between the participants' knowledge icon and others. Knowledge transfer models need to reflect on the possibility of such constructions existence within even a small community, such as employed in a small firm. These discriminations will ultimately affect individual's knowledge warranting mechanism.

### **Constructs that differ from knowledge icon**

The following constructs were extracted as the bi-polar construct to that construct that discerned a knowledge icon:

*Only take-in what they want to know*

The above described the individual with a fixed mindset who rigorously filters the knowledge acquisition process. This does not mean a person who never learns because they will learn on condition it is something they have anticipated and are willing to construe.

*Can only learn from watching*

Knowledge is gained from all forms of engagement but for others it is seen to be restricted to the principles of looking and learning – popularly referred to as 'Stand by Nellie'..

*Receiver of Knowledge*

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The foundation of any knowledge system is the willingness for all to contribute and benefit. It is a weakness to identify employees in exclusively the transmitter or receiver group, everyone should aim to participate in both activities.

#### *Not recognised*

This highlights the professional skills of human resource management are less developed within small firms (Sparrow, 1999). Certain people in the case company were distinct because their knowledge was not recognised. Every individual in the firm had something to offer that firm but only a few were singled out as being reputable for their knowledge – specific or otherwise.

#### *Lack experience*

The constructs incorporating experience dominate this research. A lack of experience referred to a lack of exposure to a range of events. Nonaka and Takeuchi (1991) emphasise the value from job rotation in the knowledge intensive company.

#### *Specialise*

This was related to the experience issue. A breadth and depth of knowledge was preferred to specialising. This is not to condemn the importance of specialists but in this context the specialist has a narrow focus and is not considered a knowledge icon.

#### *Weak character*

A weak character being the antithesis of strong character. A weak individual fails to convey what they know and fails to maximise on opportunities to acquire new knowledge. Linked to this issue is the construct ‘Nervous about getting the knowledge’, which arose as opposed, to confidence. People comfortable with anticipating events using a personal construct system may feel anxious at the prospect of changing that construct system.



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*Stayed the same*

The turnover of staff in this case company was low with many employees serving long periods of loyal service. The machinery had also been in service for a considerable time. The life of one of the press machines exceeded 30 years, the technology in the company had not advanced with any great haste. There was little job rotation with only a few employees able to operate in alternative areas. Therefore, the construct *stayed the same* can be appreciated.

*Schooling was not important*

Nobody in the case company had attended university. Some had attended further education courses as part of their apprenticeship. The company was particularly supportive of vocational training but was unable to resource any foundation in education. It was apparent that none of the operatives had any school qualifications beyond GCSE, the majority with no qualifications. Discussion frequently referred to the participant's primary socialisation failing to emphasise the positive effects of a sound education.

*Practical*

Knowledge, it would seem does not relate to manual occupations. The opposing pole of this construct was *theoretical*, able to think intelligently and resolve problems. The practical construct emphasised the elements ability to perform manual tasks.

*Lack the ability to present what they know*

The inability to demonstrate presentation skills was a common theme. Not surprisingly, considering the background of many employees, their awareness was minimal. The opposing pole highlighted the respect for individuals who had the ability to stand

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confidently amongst others and present their knowledge in a manner that communicated effectively.

*Blinkered can't always see*

This issue relates to the earlier construct that stated *Only take-in what they want to know*, see previous comments.

*Never learn*

At this point it is worth considering that the constructs were elicited from nine elements that were directly related to the participants' work and one element outside of the work environment. Thus the construct 'never learn' also applied to individuals that had a connection to work. Individuals were discriminated as being in a state of never learning. Here there is a desperate sense of inertia that appears in contradiction to all the company's claims as an Investor in People. A question arises as to whether the management are fully aware of the individuals who 'never learn' and if they are aware, how can they respond?

*Any transfer is informal*

The informality refers to the ad hoc approach adopted to transfer knowledge. The transfer may or may not take place. It is unpredictable and unquantifiable but nevertheless valuable. A certain degree of informality has long been recognised as prevalent in all business entities. The informality includes the relationships shaped by elusive phenomena, such as trust, beliefs, loyalty and unwritten norms (Badaracco, 1991).



*Summary 'When I say knowledge the first person you think of'*

The purpose of this spotlight on the knowledge icon was not to eulogise the icon to the point that the constructs become a recipe for the perfect knowledge worker. It was useful to examine what are some of the practical issues that distinguish the icon that are transferable skills. Management cannot start life anew for those who have not enjoyed sound education or address substantive personality traits. However, as an example, it is feasible to build up trust by ensuring employees can initially trust their employer. Also ensuring information is reliable. The management may reconsider opportunities for job rotation. Much can be achieved in a small firm to heighten the perception of more employees to construe colleagues as imitating the knowledge icon.

Equally relevant is the examination of the antithesis of knowledge icon. Once again much can be achieved by addressing the needs of employees whose constructs appear to undervalue their state of knowledge. The researcher emphasises the forward approach relevant to construct theory. A person's history has ante ceded the construct but the purpose is to anticipate future consequences given this set of constructs and not to dwell on the person's past.

Finally it is opportune to note, at this point, that the constructs were considered neither right or wrong. This is what they were and this was the construct system in use. Management are advised not to condemn constructs but empathise with the individual and attempt to understand their meaning.

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## Section 6 Socionets

As previously stated, it is not possible to look at the content analysis without the underpinning of the individual cameos. Thus it evolves that it is unsatisfactory to look at the individuals without placing them into a collective domain of action (Tsoukas and Vladimirou, 2001). The society in this instance incorporates organised work groups and organic communities. In the context of construing grounds for knowledge it is interesting to see the differing links and isolates within group and community.

In Part A of the repertory grid process the elements were given titles and the same set of element titles were used with all participants. The sociogrid package (Shaw, 1980) enables ‘an intuitive idea of the extent of sharing’ (Shaw, 1980, p.88) by bringing together the individual constructs elicited from the same elements. The development of the program, which calculates every individual set of constructs using the pairs algorithm, is described in Shaw (1980). It was not feasible to examine the extent of sharing in the context of knowledge and artifacts (Part B) due to the elicitation of *both* elements and constructs. The software program requires that either elements or constructs or both are the same with the group.

Personal Construct Theory (Kelly, 1955) incorporates the theme of interpersonal relations in both commonality and sociality. The commonality corollary suggests that two people may act alike in aspects of their construing even when individual experiences have been quite different. The way that any combination of experiences has



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been individually construed may ultimately lead to people living with similar (shared) constructions.

The sociality corollary states that: ‘To the extent that one person construes the construction processes of another, he may play a role in a social process involving the other person’ (Kelly, 1963, p.95). Grounds for knowledge and knowledge appropriation are considered a social process. The sociality corollary is significant in exposing the level of understanding that exists in the company. It creates a picture of individuals behaving in the role of the psychologist. Not necessarily a good or bad psychologist but adopting the role that helps one person to understand another. This does not mean the person has to adopt the others constructs in a futuristic clone idealism but only attempt to understand their meaning.

The value in the sociality construct is reinforced by the warning from Bannister and Fransella (1986,) that:

..if we cannot understand other people, that is we cannot construe their construction, then we may do things to them but we cannot relate to them  
(p.18 emphasis authors own).

The commonality construction has on occasion been misinterpreted and any commonality is thought to be a holistic commonality between individuals. However, commonality does not suggest that because A shares X similarly to B that A also shares Y similarly to B. It also does not correlate a particular experience, for example, a shared training course as being the cause of the commonality. This contradicts the work of

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Schein (1985) as featured in Nonaka and Takeuchi (1995). Schein proposes that shared experiences will lead to a shared view.

The socionets output from the sociogrid package reflect the sociality corollary by analyzing from the grid data the extent to which the constructs in one person's grid shows the capacity to construe the constructs in another person's grid. This is an asymmetric relationship. The socionets incorporate links with suitably placed arrows. An arrow from X to Y indicates that X has adequate constructs to construe those of Y (with the criterion of adequacy being set by parameters specifying the percentage of constructs matched at least at the specified level).

As has been emphasised previously, Personal Construct Theory is not retrospective but forward looking. The sociogrid is revealing the *present constructions* between the participants that were shared. It is not denying that constructs may alter and consequently result in either a greater or lesser network of shared constructions. The socionet analysis discloses a situation that has potential for change.

The understanding of others constructions that are apparent within the company can be associated to age, management expectations, and life expectations a number of variables. The similarities illustrate a particular culture. This culture can be defined as people grouped together due to similar backgrounds within a particular environment, relating to stimulus-response theory. A number of the participants described their lack of education and lack of opportunities whilst growing up as the cause for their current status.



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Kelly describes a view of culture being similarities in expectations of the group, 'essentially a similarity in what a person perceives is expected' (Kelly, 1955, p.93).

Prior to this research the links in grounds for knowledge within this small firm, may never have been explicit. The output may assist management and also engage individuals in the exploration of other constructs they may have never considered. Nonaka and Takeuchi (1995) describe frequent dialogue and communication as creating a common cognitive ground facilitating the transfer of tacit knowledge. A common language is also seen as criteria for sharing knowledge (Davenport and Prusak, 1998). The social roles within the case company are played out in the light of how others around them view the world. The findings from sociogrid analysis help to illustrate how the participants own social reality in this particular situation is being understood by others alongside their own construction of reality.

Nonaka and Takeuchi (1995) suggest four modes of knowledge conversion including socialization that leads to shared mental models. The socialization aspect incorporates a sharing of tacit with other tacit knowledge to create shared mental models. The findings from the sociogrid suggest that employees who share experiences, that is, for example, working press machines will have some commonality with colleagues but not essentially identical mental models instead they can form communities with others outside their defined work group. The sociality is not in equilibrium and appears as a chaotic array of shared construing and isolation. Table 7 and Figure 32 include all participants' constructs in relation to knowledge and people revealing communities of shared meaning across the functional boundaries.

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Socionets are formed from the matrix of similarity measures between pairs of individual grids. The socionets reveal multi connections between the participants or isolated individuals. It should not be presumed that the isolated individual has little to offer the group as they may well be the individual with creative, innovative thoughts but unfortunately not willing or able to communicate this mindset. Whereas other individuals appear to have much in common with their fellow participants but this could mean they are the 'muddled compromiser' (Shaw, 1980, p.93) with little in the way of original thinking.

This section will examine socionets following the hierarchical structure of the company, that is, the Works Director together with subordinates, Technical and Commercial Director together with subordinates and administration. Followed by a community led approach with a complete view of all the participants outside of their functionally divisions.

### **Works Director and subordinates**

The socionet in Figure 28 incorporates the Works Director, Shift Controller (here named Supervisor) and eleven of their subordinates. The patterns of response in any construct were matched for the extent of construing at the 80 per cent level. The effect of setting this parameter higher, that is, at the 85 per cent level is seen in Figure 29. The links were seen to reduce when this was taken to the 85% level. In the analysis of the other groups it was found that taking the parameter to the 85% level resulted in limited sharing of constructs therefore findings in this section are drawn from the socionets set to 80%.



Table 4 summarises the situation of construing within this group. It can be seen that two individuals *ten* and *fifteen* did not possess adequate constructs to construe any of their colleagues constructs in the context of knowledge and people. In the case of participant *ten*, with learning difficulties, this was most likely due to the low number of constructs that were elicited and also related to communication constraints.

However, in the case of participant *fifteen* the constructs were unique in that they concentrated on his cultural (West Indian) background. When the extent of construing was taken to the 85% level participant *fifteen* was seen as the total isolate. He was unable to construe others and no one in the group construed him. Similarly participant *six*, of Asian extraction, could only construe participant *ten*.

Participant *seven* had the highest number of construct links with other participants and validating this finding was the participants own summary as, "*knowledge is something social*".

When the extent of construing was increased participant *seven* was still able to be understood by three participants.

A final observation relevant to this group is the position of participant *one*, the Works Director. He revealed adequate constructs to construe the constructs of five other participants but none reciprocated. He understood others but none could understand him. When the extent of construing increased he was still able to understand the supervisor and participant *ten*. The strong links with the supervisor are to be expected but the

continued links with participant *ten* reveal something of the Works Director’s efforts at understanding his subordinates.

Table 4. Works Director and subordinates commonality and sociality of construing (knowledge and people)

Participant	Adequate constructs to construe (* denotes reciprocal)	Total One way constructs	Total Reciprocal constructs	TOTAL
001	006, 007 ,009, 013, 018	5	None	5
002	003*, 007, 009, 010 ,013*	3	2	5
003	002*, 013, 015	2	1	3
005	007*, 018	1	1	2
006	010	1	None	1
007	005*, 006, 009*, 012*, 014*, 018	2	4	6
009	007*, 012*	None	2	2
010	none	None	None	None
012	007*, 009*	None	2	2
013	002*, 018*	None	2	2
014	007*, 013, 002	2	1	3
015	none	None	None	None
018	006, 010, 013*, 015	3	1	4



FIGURE 28. SOCIONET OF WORKS DIRECTOR AND SUBORDINATES  
MATCHED FOR THE EXTENT OF CONSTRUING AT THE 80 PER CENT LEVEL

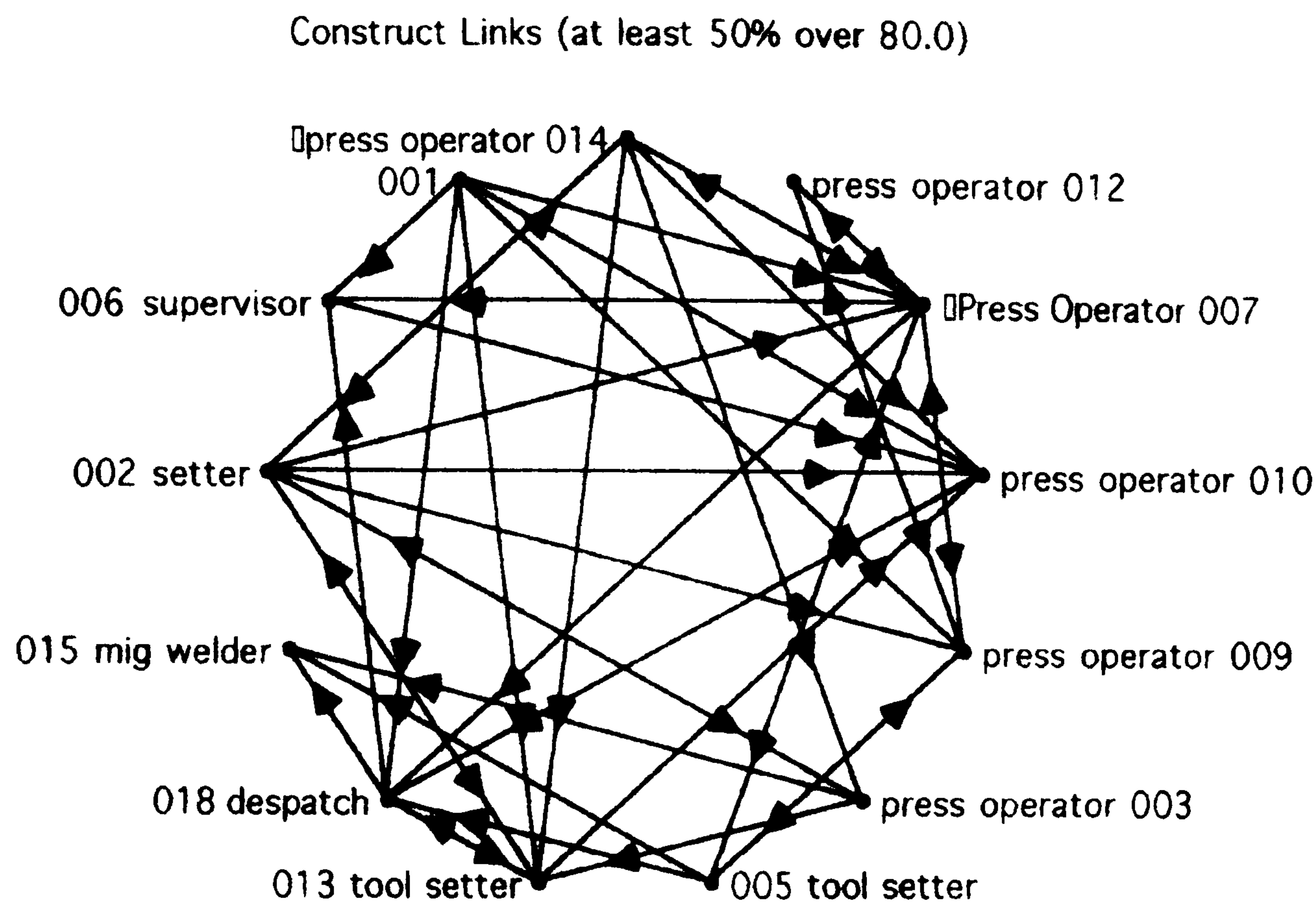
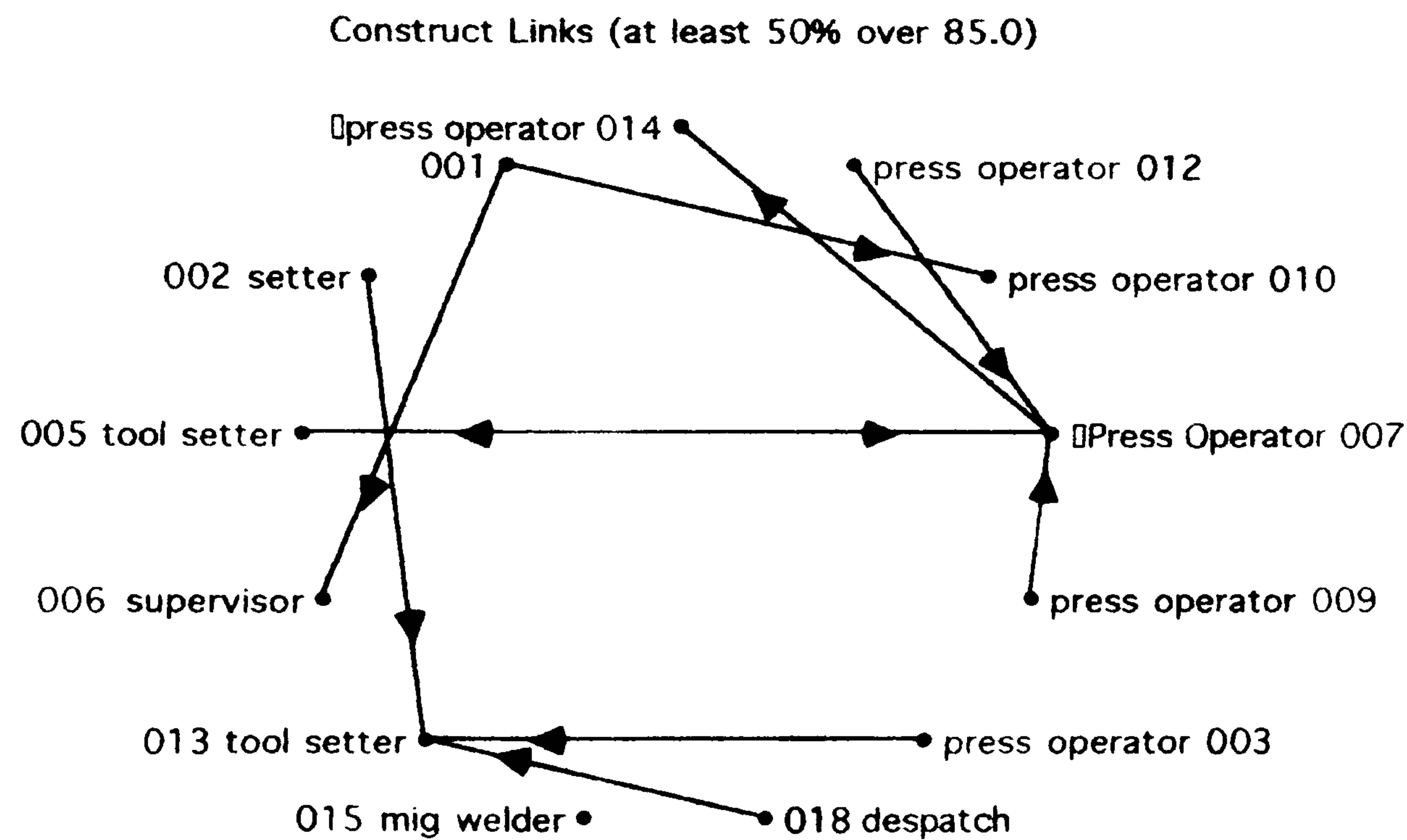


FIGURE 29. SOCIONET OF WORKS DIRECTOR AND SUBORDINATES  
MATCHED FOR THE EXTENT OF CONSTRUING AT THE 85 PER CENT LEVEL



## Technical and Commercial Director and subordinates

Table 5 illustrates the extent of construing within this quality and tool room function. It would appear that in the context of knowledge and people the apprentice had no understanding of his superiors and no one was able to understand his constructs. The apprentice was young and attending college with the potential to introduce a new manner of knowing. His constructs focused on the age issue and this could be the key factor in the apparent lack of understanding. The older colleagues were confident that their experience resulted in superior knowledge warranting and discriminated against the young apprentice who could potentially offer new knowledge constructions.

The Technical and Commercial Director held inadequate constructs to enable him to relate to subordinates. However, his immediate subordinate was able to relate to him. A telling feature of the Technical and Commercial Director was his construct “*thinks he knows – actually knows*”. This construct suggests a lack of trust in the knowledge of others and a potential degree of cynicism for grounds for knowledge used by others.

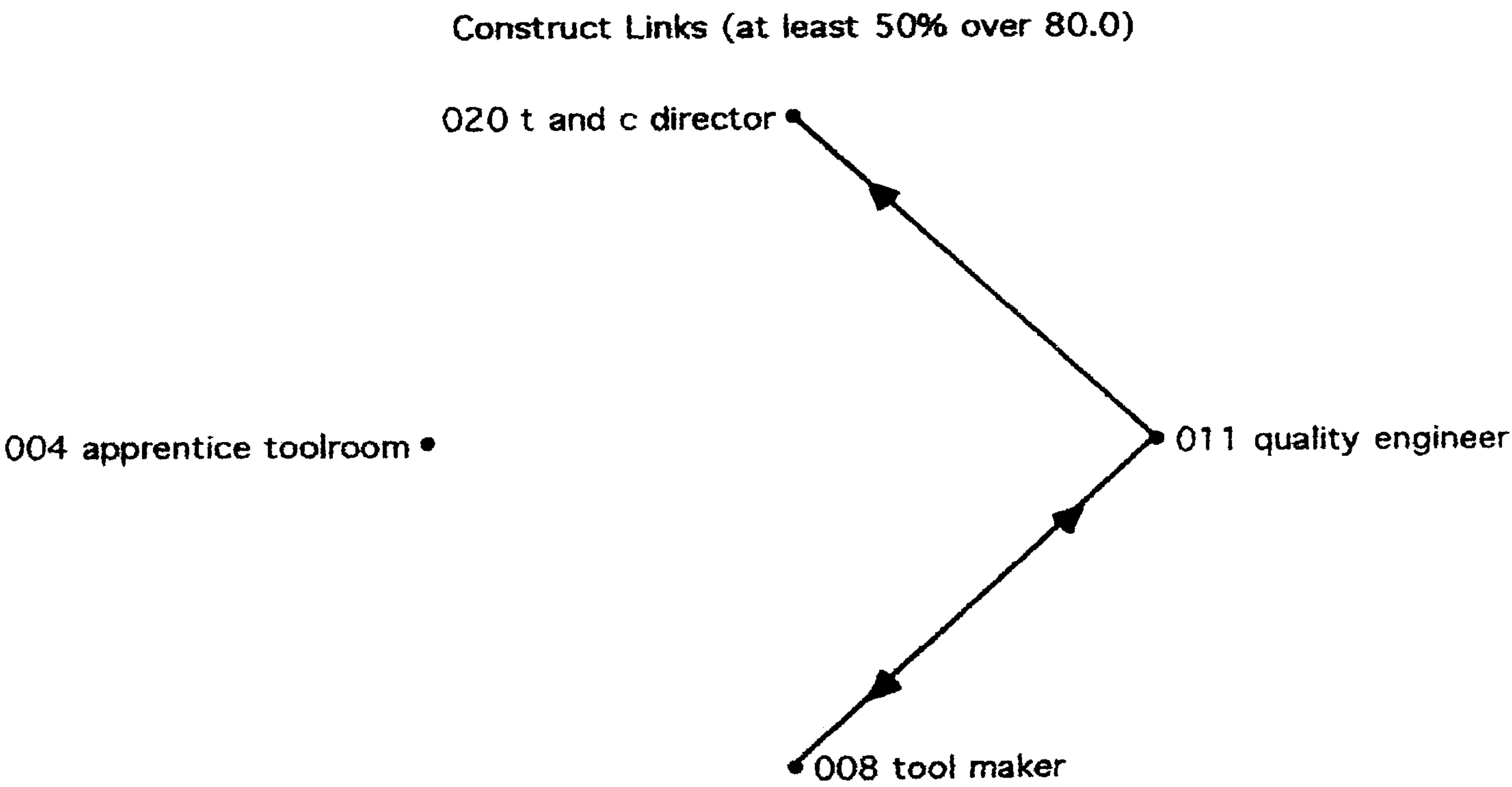
A two way reciprocal construing was seen between participants *eight* and *eleven*. Participant *eight* was close to completing his apprenticeship and *eleven* nearing retirement. The individual cameo of participant *eight* illustrated his respect for experience and his opinion that college was merely a foundation. There appeared to be closeness between participants *eight* and *eleven* but a negligible rapport or respect for the new apprentice.



Table 5. Technical/Commercial Director and subordinates commonality and sociality (knowledge and people)

Participant	Adequate constructs to construe (* denotes reciprocal)	Total One way constructs	Total Reciprocal constructs	TOTAL
004	None	None	None	None
008	011*	None	1	1
011	008*, 020	1	1	2
020	None	None	None	None

FIGURE 30. Socionet of Technical and Commercial Director with subordinates matched at the 80% level



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## Management and administrative staff

The Board of Directors and the administrative staff were located on a mezzanine floor above the production area. The three administrators shared an office and the directors had individual offices. Participant *sixteen* had a prime function in personnel and senior secretarial duties. Participant *seventeen* performed routine day-to day administrative support to all of the directors and participant *nineteen* was company book keeper.

From the cameos it was evident that participant *sixteen* saw herself in a privileged position, married to the Managing Director, grammar school educated and socially superior to many fellow employees. The results in Table 6 illustrate that she was in a position of possessing adequate constructs with participant *twenty* Technical and Commercial Director. A telling sign is the lack of constructs to construe the only other working director, participant *one* and the other administrative staff. Equally, however, the latter also had inadequate constructs to understand her.

It is fortunate, for the company that the two directors who were expected to lead the sales and productivity functions of the organization were able to socially construe each other in some areas. Thus the potential for knowledge transfer to take place would not suffer the obstacles of misunderstanding that could otherwise occur.

On a final note, participant *nineteen* was in a role where she openly commented on the necessity to “*tell lies sometimes*”. She offered typical examples of lying about payments or receipt of invoices. In an open office her colleagues were in audible distance and

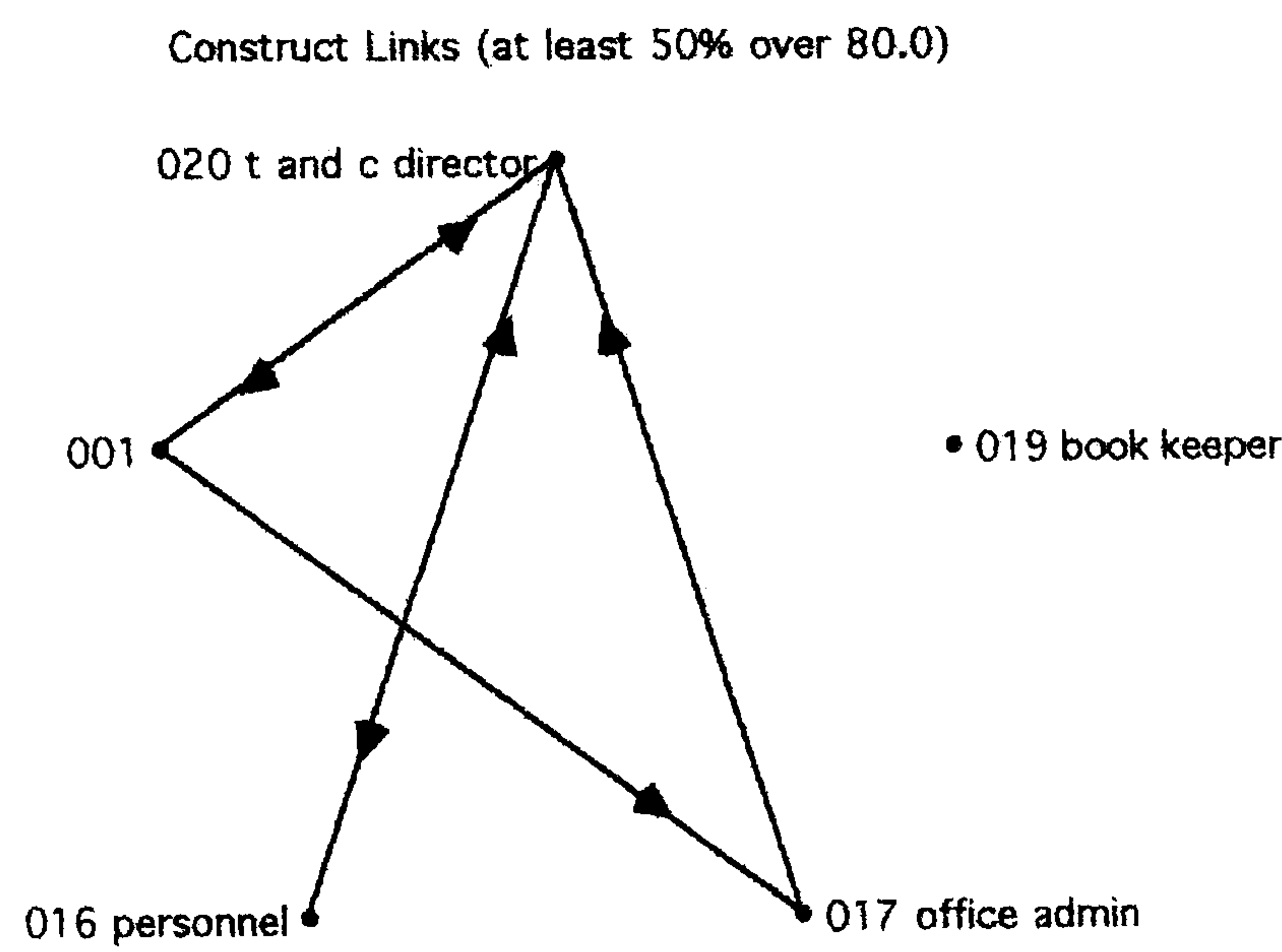


therefore exposed to this participant’s ability to convince others of ‘facts’ that were untrue. Further research is called for to investigate whether this factor can affect grounds for knowledge claims in her other work areas. Participant *nineteen* appears in Figure 31 as an isolate.

Table 6. Management and administrative staff commonality and sociality (knowledge and people)

Participant	Adequate constructs to construe (* denotes reciprocal)	Total One way constructs	Total Reciprocal constructs	TOTAL
001	017, 020*	1	1	2
016	020*	None	1	1
017	020	1	None	1
019	None	None	None	None
020	001*, 016*	None	2	2

FIGURE 31.SOCIONET DIRECTORS AND ADMINISTRATORS MATCHED FOR THE EXTENT OF CONSTRUCTING AT THE 80 PER CENT LEVEL



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## Communities of knowledge construction

Communities are not imposed by management but form from what matters to the community members (Wenger, 1999). They share an understanding of purpose and meaning that over rides the functional division of labour. This study included an objective to uncover the personal and social construction of knowledge epistemology. This contribution to the findings reveals preferences in a manner of knowing amongst communities.

In Table 7 participants are listed alongside other participants who have common constructs and participants whose constructs they understand but may not be reciprocal. Individual participants who in the previous section, representing hierarchical structure, were seen not to show any commonality or sociality in their construing with immediate colleagues are now examined as part of a complete social network (see Figure 32). This illustrated that participants may have adequate constructs to share in the construing of other employees working in different sections of the company. They had formed communities in ways of knowing outside of management control or intervention (Brown and Duguid, 1998).

Participant twenty, a member of the senior management forms a community with four other participants in personnel, despatch, shop floor and a fellow director. They all shared a construct of communication as a key issue in knowledge warranting. Learning and openness were also common. However, other constructs they held were not shared.



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Participant sixteen who appears as a member of this community also considered someone's 'privileged' biography as part of epistemology.

Participants, four, ten and nineteen all appeared as isolates amongst their immediate colleagues are now seen to possess constructs similar to others. The apprentice, participant four, in particular had a sound network of individuals with whom he could share his understanding of grounds for knowledge. All of whom had a high regard for knowledge from experienced management. A further example is provided by participant nineteen who discriminated in terms of people's perceived intelligence as did participant nine – they formed a community with this common construct. This sharing of constructs has not arisen because the participants have shared experiences. The history of the construct is not the prime concern instead it is interesting to note what construct the participants are currently using in their communities.

Participants, who revealed a good understanding of immediate colleagues, also indicate a commonality and/or sociality with employees outside their immediate domain. The Works Director stands out as contrary to this statement. His constructs appeared limited to the areas in which he had an immediate responsibility and authority. His opportunities to join or form a community outside of his pressurised and time constrained working day were restricted. He communicated with whom he was required to communicate in order to achieve a task.

Participant fifteen, the West Indian male has opted not to join any community. However, others have clearly attempted to understand him, namely participants, three, five, eight,

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eighteen and twenty. Thus, their commonality in constructs was sufficient to encourage a greater degree of socialization than currently present. They were looking for new members of their community to reinforce existing constructs or develop weak ties outside their community (Hansen, 1999) to test alternative ways of construing.

The table also shows participant seven, a press operator as reaching out to eleven of his fellow colleagues. Once again it is relevant to stress here that this may not indicate a broad minded diverse construer but instead can pinpoint the ‘muddled compromiser’ (Shaw, 1980, p.93) unlikely to prove innovative and original but rather more agreeable than most and choosing to belong to a number of communities. This individual may act as a valuable link between communities.

Table 7 highlights the social exchange that resulted in shared and common construing. Thus constructs were validated by the successive experience of the employees. The significant degree of commonality and sociality that is useful in knowledge warranting has yet to be proven. Yet, certain factors drawn from construct theory are significant. The danger that is exposed by the sociogrid analysis is the apparent lack of choice in construing new elements that could challenge and modulate existing constructs. The existing sharing subsumes a degree of comfort and stability without the upset and confusion that arises when existing constructs reliably validated by others are then challenged. Strong ties can hold a community together but at the same time create stagnation in construing (Hansen, 1999).



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Contact with external key informants is restricted and therefore new social contact arises predominantly from new employees or changes in home/social life. A new acquaintance will potentially give rise to the questioning of constructs. Additionally, introducing new knowledge artifacts can help to represent knowledge in an alternative fashion. The shared understanding can have a positive effect on knowledge sharing but it is important not to lose sight of what could be the down side of the commonality and sociality. When, for example, the company employs a young, inexperienced but extremely capable individual who cannot be accepted into a community because the community members seek solace in acceding to knowledge relating to age and experience.

Management may attempt to overcome such discrimination by pressing the organic community to accept a new member. However, management would be advised to see the community as activists and therefore fostering the introduction of new members but not enforcing it (Brown and Duguid, 1998).

Table 7. All participants' commonality and sociality (knowledge and people)

Participant	Adequate constructs to construe (* denotes reciprocal)	Total One way constructs	Total Reciprocal constructs	TOTAL	Total Individuals outside section
001	020*, 018, 017, 013, 010, 009, 007, 006	7	1	8	1
002	019, 014*, 013*, 011*, 010, 009, 007, 003*	4	4	8	3
003	020, 015, 013, 011, 002*	4	1	5	2
004	018, 017*, 016*, 014*, 010, 005*,	2	4	6	6
005	018, 017, 015, 009*, 007*, 004*	3	3	6	4
006	020*, 017, 016*, 011*, 010,	2	3	5	4
007	020, 018, 017, 016, 014*, 013, 012*, 009*, 006, 005*, 004	7	4	11	6
008	015, 011*, 010	2	1	3	2
009	012*, 007*, 005*, 002	1	3	4	2
010	017*, 011*	None	2	2	2
011	020, 017, 013, 010*, 008, 007, 006*, 002*	5	3	8	6
012	007*, 009*	None	2	2	None
013	020, 018*, 010, 002*	2	2	4	2
014	017, 014, 013, 010, 007*, 004, 003, 002	7	1	8	6
015	None	None	None	None	None
016	020*,006*, 004*	None	3	3	2
017	020, 018*, 010*, 004*	1	3	4	3
018	020*, 017*, 015, 013*, 010, 006,	3	3	6	2
019	009	1	None	1	1
020	18*, 16*, 15, 006*, 001*	1	4	5	3



Construct Links (at least 50% over 80.0)

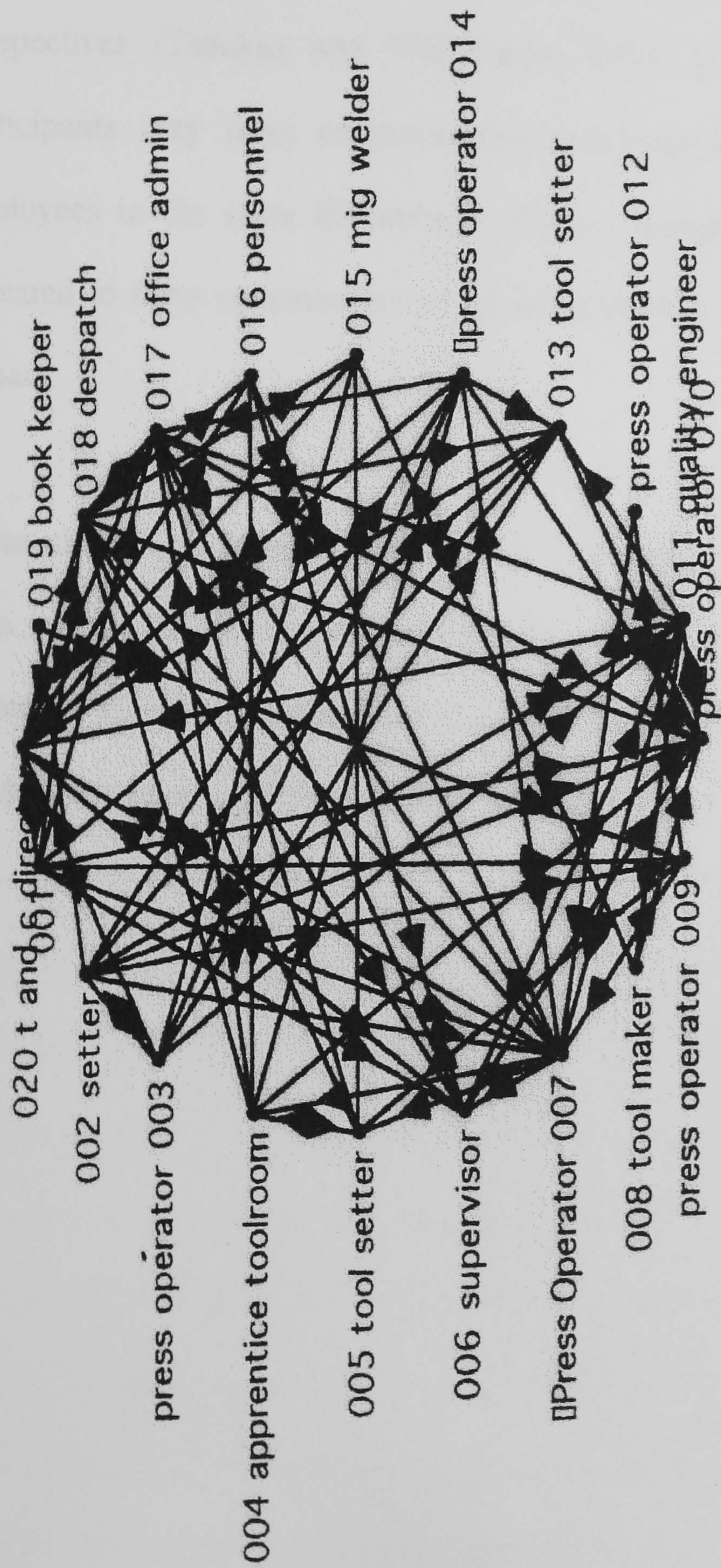


FIGURE 32. All participants.



### *Summary of Socionets*

Lave and Wenger (1991) have identified communities of practice within a domain of action. Communities are not the same as work teams, departments or divisions. This study has elicited the 'practice of knowing' in one domain of action from two perspectives (Tsoukas and Vladimirou, 2001, p.990). Firstly, it was found that participants may have common constructs and a degree of sociality with other employees in the same hierarchical groups. Secondly, it was found that participants appeared to form communities of knowing outside their hierarchical departmentalised domain.

It was clear that all twenty participants employed by one small firm had not formed close relationships (Wickert and Herschel, 2001) and offered a highly differentiated mastery of knowledge warranting. Knowledge epistemology meant different things with different communities (Tsoukas and Vladimirou, 2001).



### *Findings Summary*

The Findings Chapter is divided into six sections. Each section has contributed to the aims of the original research question by presenting and analysing the relevance of aspects of the original complete data set. The opening section focuses on the contribution provided by the elements which form part of repertory grid technique. The second section is a detailed set of cameos drawn from each participant. The third section looked at links between Part A of the repertory grid process and Part B. The fourth section provided an opportunity to consider all the constructs detached from their original provider and placed into a content analysis frame. The fifth section pulled out constructs elicited in respect of a knowledge icon. The final section indicates the sociality and commonality, or communities of epistemology, amongst this group of twenty participants from one small firm.

In section one it was found that all participants, regardless of position in firm, were able to supply a label for each role title supplied in Part A of the process meaning they all considered themselves living as part of a social network. The label offered for element one ‘when I think of knowledge the first person I think of’ was significant. It was never an employee or manager of the firm. Elements offered in Part B exposed the low incidence of artifacts recalled by participants. Some artifacts were also personal whilst others more widely available. None of the elements provided by participants was common to all. The firm had not developed an artifact to represent all knowledge used in daily operation. Technology had minimal exposure.

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In section two it was found the cameos provided a multitude of patterns of construing, each participant offered a unique insight into their warranting mechanism. All of the participants, *even* the ‘little people’ had something to offer the study showing that inclusive holistic studies of small firms are valuable. The cameos show what issues are important to participants when considering how they know what they know. The terminology used to label a construct uses the language of each participant and was therefore of considerable value in their analysis and feedback.

In section three patterns emerged that linked what a participant offered in Part A of the process and then what was described in Part B. Hierarchy still impacted on constructions for some. Knowledge related to management, management to education and education to books. Yet those in management had moved on to new artifacts that they found challenging but rewarding. For some, particularly the illiterate, books still seemed to personify knowledge despite the many other variables contributing to knowledge epistemology. Others who in Part A had indicated a preference for knowledge warranting though close personal, trusting relationships also stated their interest in artifacts produced by their colleagues, supporting Garud and Rappa (1994).

In section four Part A common themes revealed in the content analysis were: transfer of knowledge; indicative of a responsive domain of action, values, experience, specialist knowledge and academia. Part B emphasised participants’ concerns in engaging with artifacts, that is, the skills and abilities demanded. Other strongly prevalent themes involved the range of convenience of the artifact, participant’s contribution to the artifact and validity.



In section five it was found the warranting mechanism of a knowledge icon could be distinguished in terms of many qualities. An icon was not just an educated and intelligent person (Davenport and Prusak, 1998). The antithesis of a knowledge icon was not just an ignorant person, it was indicative of a failing to construe their immediate domain of action and wider society as a suitable laboratory to develop the art of knowing (Polanyi, 1962).

Section six sought the collective understanding that would indicate where participants found reinforcement for their existing constructs in the context of knowledge. It was found that this was either amongst their immediate functionally divided colleagues or in alternative communities drawn from within the small firm.

## CHAPTER FIVE

### CONCLUSION AND RECOMMENDATIONS

#### Conclusion

This conclusion summarises a response to the original research question. In addition conclusions are drawn arising from insights which exceed the limits of the research scenario. This thesis has examined knowledge from the standpoint of how knowledge is appropriated in order to inform management processes. It may be of special interest to small firm management.

Attention has focused on a mixed group of twenty employees from one small firm aiming to expose the situated knowing in a small firm (Cook and Brown, 1999). It was thought useful to consider how they know what they know from two perspectives. Firstly, considering the people issues and secondly examining the relevance of artifacts. Models and frames highlighted in the literature review and referred to throughout by the author were not 'tested' against the situation but informed the research question and process. Extant theory in the organisational knowledge domain remains scant and little has specifically addressed small firms. This study complements the work that has taken place and may contribute to our understanding of the knowledge issue in relation to the present world of work by highlighting the significance of knowledge epistemology in a small firm context.



This investigation concludes knowledge epistemology in a small firm is a highly complex mix of both personal and socially construed discriminations that emphasises the central position of people over and above artifacts. The context of a small firm is different and therefore warrants attention. All participants, regardless of role or status, were skilful in the art of knowing something that suited their way of life. All participants were able and willing to make a distinction in respect of how a knowledge icon knows what they know. Warranting mechanisms in the context of a small firm appear as personal in tandem with a social significance. Employees form communities of knowing outside their functional divisions even in a small firm. When considering the role of artifacts in knowledge, actual engagement with artifacts is of greater significance than properties of the artifacts.

### **Epistemology in a small firm**

It was apparent that participants could be described as empiricists, seeing is believing stood at the forefront of their construct system, a complete reliance on sense data; whilst others would fit into categories of analytical scientist, conceptual theorist, conceptual humanist or particular humanist (Reason and Rowan, 1981). Even within this small population of twenty individuals it was concluded that many facets of epistemology prevailed with much emphasis on people issues. The grounds for knowledge were not necessarily judged as the right kinds of grounds (Audi, 1998).

The theme of knowledge transfer projects from the gathered data suggesting knowledge is appropriated and judged based on people's willingness, reliability and ability to

transfer what is known. Management in small firms may note that all employees have knowledge of sorts and it is beneficial to ensure that opportunities arise for knowledge to be transferred. Those opportunities should extend to basic literacy, confidence and communication.

This study further supports Boussouara and Deakins (2000) conclusions that trust and openness are paramount to an active knowing culture. Trust and openness are essential to ensure employees are comfortable with sharing what they think they know and not facing accusation and condemnation if their knowledge is misguided. Employees may have held their personal knowledge for some considerable time and to discover that modification is required can create a disturbance in an entire system of constructs. The trust and openness between individuals is influenced by their personal bond. Participants valued social and personal relationships where opportunities exist to share knowledge in a domain free from work peer pressure.

This investigation has focused on a small firm; a majority of the participants had experienced only a modest education. Studies of small firms have failed to appreciate the meaning of education to those who view themselves as 'uneducated'. Education was construed as providing a basis for knowledge and as a key issue in distinguishing oneself as either a transmitter or receiver of knowledge. Education was a notable element in knowledge construction. Recall in Chapter 2 Machlup's approval of more investment in education processes. A view supported by Davenport and Prusak (1998) with a commendation of knowledge as someone both educated and intelligent. Participant constructions would also suggest that knowledge acquired as part of school learning is



highly regarded. The semantic understanding or school learning (Sparrow, 1998) is just one dimension of knowledge but for many it appeared to be a key issue in relation to opportunities. The trainers and management were perceived as educated (sometimes inaccurate) and therefore better equipped. An education was therefore considered valuable in that people are taught how to communicate, read, write, study and analyse. Thus the educated have skills to appropriate knowledge and give it function. The participants held in high esteem the themes of intelligence and academia. Dixon (1999) applauded a learning process rather than the learned; case study participants disagreed.

With the plethora of interest in organisational learning it came as a surprise that a link between learning and knowledge was not borne out by research findings. The investment by management in learning was seen to be biased towards tasks and not compensating for the education that many felt they missed in childhood. Small firms already facing immense pressure are rarely able to support non-vocational studies.

In order to validate what is known we seek replication to reinforce our meaning. This practice has long been held as a scientific standard. Replication can be enforced through experience. Participants concluded that knowledge and experience were highly correlated. It was the perception of experience that was questionable. This was often construed as experience related to age despite the sum of a person's experiences not particularly accounting for valid knowledge. Experiences lead to episodic memories (Sparrow, 1998) that have greater chance of recall depending on their richness. The features that compose the richness are personally biased as is the ability to accurately

share those memories. In this sense experiences may offer a variety of incidents to encode and build richer pictures. Some may gain more from experience than others.

In contrast with replication others construe knowledge construction as a gallery of pictures assembled from a multitude of different experiences. The variety and range are considered more meaningful than a replication of like events.

In summary, we still know very little about how and on what basis knowledge is formed in today's workplace (Alvesson and Kärreman, 2001). This study suggests knowledge episteme centres on people factors and management may overlook the legacy of primary socialisation (Berger and Luckmann, 1991).

### **The context of a small firm**

This study concludes the context of knowledge appropriation is relevant (Bohm, 2000). It was apparent that small firm employees do not necessarily find knowledge easily accessible either socially or in explicit representations. The small firm may not offer an ideal laboratory (Kelly, 1955). The smallness offers no guarantees of sound simple warranting mechanisms. Tsoukas and Vladimirou (2001) refer to collective understanding in a large call centre environment. In further support of Jones and Tilley (2003) the collective understanding taking place in a small firm may not, contrary to popular belief, include all the employees. Even in a small firm there were signs of



isolation (Wickert and Hershel, 2001). Small size did not mean common constructs and there was evidence of ‘novelty’ (Tsoukas and Vladimirou, 2001, p.989).

The participants from this small firm suggested minimal form of representation and minimal quantity; participants pondered over naming six elements. However, this was not a paperless company because all relevant data had been abstracted, codified and hoarded electronically. It just offered an alternative approach to knowledge storage. In support of both Holliday (1995) and Badaracco (1991) much of what was known was found to exist in people’s heads with little written down.

The lack of resources in small firms makes it difficult for management and employees to undertake research into areas not previously explored yet small firms would benefit from such an undertaking. In order to overcome this constraint the case company participated in university supported research. However, research undertaken was then primarily satisfying the knowledge gaps identified by others outside the firm but as a positive step it also satisfied participants call for inclusion and involvement. Employees enjoyed research which offered inclusion and provided a greater sense of affinity with research outcomes.

The number of employees who actively engaged with other individuals external the case company on a commercial basis was minimal. Extracting titles for external elements in the knowledge and people context was troublesome. However, in the context of knowledge and artifacts employees were quick to mention the value of television, radio and newspapers – all providing an external perspective. This case indicated that any

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knowledge expansion was curtailed by a lack of appropriate external association yet for small firms the links with an external community remains critical (Mitra, 1998). This study concludes that knowledge within the small firm was in danger of becoming self-contained akin to a bounded autopoietic space (Maturana and Varela, 1980). Opportunities for discovery from external sources either remained under the control of management on a 'need to know' basis or resulted from ad hoc gossip amongst employees.

Our state of knowledge has change capabilities but only when conditions allow. In this case a certain degree of inertia was concluded with many participants viewing 'me' and 'me as I would like to be' as almost identical. They were preoccupied with old material and chose not to construe alternatives. This outcome was not surprising as the opportunities to experiment across all dimensions were minimal. The work itself was repetitive; participant's field of view was rarely stretched and fresh external contact particularly limited. It was understandable that participants would not construe themselves as moving along a continuum towards a state of discovery when they had no laboratory in which to experiment. The conditions within this case were concluded as unfavourable for knowledge extension due to the limiting effect on any warranting mechanism. A small group of employees had opportunities to engage with a wider social group but then little opportunity to share what was discovered by way of validation.

A restraint on small firms is the limited opportunity to create 'redundancy' (Nonaka and Takeuchi, 1995), to permit social interaction. The style of operation, management and location of individuals all created barriers to any potential redundancy. In this case



employees rarely rotated work or had the opportunity to acquire information from different departments. A press operator was not expected to learn the quality inspector's function or that of a mig welder. From the administrative side there was no overlap with shop floor or vice versa. Within administration, employees already undertook a number of functions but knowledge of each others role was minimal. Time restraints on all employees did not permit any intentional overlapping of information or meta-dialogue (Bhatt, 2000). Improving redundancy will assist in development of the 'value' issue. A greater knowledge of each others work will build relations and strengthen constructs of trust and reliability. The knowledge spaces and time for knowledge exchange as knowledge in action implies was not evident.

Senior management were expected to assume a number of roles, each role represented by entire departments in a large firm. The Technical and Commercial Director was responsible for generating new business, marketing existing products, developing new products, firm diversification, monitoring competitors, managing quality staff and the tool room. Each of these areas carries a wealth of knowledge and specific demands. It was therefore concluded that in support of Ram (1994), small firm management face difficulties leaving little time to turn knowledge into a reflective practice (Tsoukas and Vladimirou, 2001).

A social aspect of knowledge projects from this study conflicting with the outcome of McAdam and Reid (2001) who concluded their small firm participants construed knowledge as scientific facts with less emphasis on a social tacit nature of knowledge.

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In small firms an owner manager is portrayed in a pivotal position around which all operations revolve. Leadership involves understanding others as a means of anticipating their reactions. This does not mean that a leader needs to share constructions with subordinates but does need to understand their construing if he/she is to rally them. In this case, the owner managers played little part in the firm as a board of directors were tasked with running the company. Two directors participated and both appeared to have a differing approach to knowledge. One held constructs that were predominantly one-way, that is, he could construe others and had great respect for trained engineers construing knowledge in terms of specialists. The other director, who was a trained engineer, shared or understood minimal constructs but with a great respect for those with a passion and breadth of knowledge. Both could be classified as key personnel to the operation of the firm but neither gave the impression of being key personnel in knowledge appropriation. They were not identified as knowledge icons.

Small firms are not little large firms and further work into knowledge warranting of management and employees is justified.

### **Applicable to all**

Ayer (1956) stated that one should have the right to be sure. An organisation's culture and structure may influence an individual in how they view their right to be sure. In a domestic or social environment this right may not undergo the same judgement criteria and leads to greater freedom and openness. In the study participants made a distinction between transmitters and receivers as though employees feel they are labelled with a



knowledge hierarchical state. This person receives knowledge and this person passes it on. In conclusion, employees in a small firm can be underestimated for their contribution to social and intellectual capital (Brown and Duguid, 2000). There were thinkers amongst the doers (Thompson et al, 2001, Brown and Duguid, 1998).

This study identified workers with limited knowledge relative to their work but substantial knowledge in alternative areas, for example, hobbies and leisure activities. The value of their knowledge in these alternative areas was of insignificant value to the firm but held personal value for the individual. Their warranting mechanism was active in an alternative domain of action.

### **A knowledge icon**

Some people have a particular approach to knowing that is upheld by others as good practice. Chapter four illustrates the 'knowledge icons' that were seen as innovative, strong and constantly changing. However, the discriminations were formed from a triad of individuals and the remaining pair sits on an opposing end *of the same continuum*. Thus we all acquire skills that assist in the art of knowing what we know but certain individuals can be upheld as more adept than others. Management may gain from acknowledging the attributes of a knowledge icon and reflecting on their potential within the firm. For example if a knowledge icon is seen to project inventiveness then where are the opportunities for inventiveness in the firm. This study concludes that identifying employees' constructs of a knowledge icon in the context of how a knowledge icon is perceived to know what they know has utility in the management of small firms.

## **Personal in tandem with social**

Management literature frequently cites the ideas of Polanyi (1962). The research has indeed revealed a personal dimension but not derived from solipsism but with participants reflecting on their social context. Their meaning is not plucked from an empty void; it is socially constructed within a specific domain of action, also seen by Garud and Rappa (1974). Individuals who construe matters differently are also part of the organisation. Such individuals may appear isolated due to their individual constructions but this does not mean their constructions are false or unreliable. But, it may be the case that their grounds for knowledge would be perceived as false and unreliable by others. This study supports the definition of knowledge by Machlup (1980) that includes knowledge that people think they know. It was clear from the case that some individuals were not respected for their knowledge because they exchanged what they thought they knew but it was 'untrue'. How should employers react to such individuals? The cameos highlighted participants who condemn colleagues for sharing what they think they know. But it is only by sharing their knowledge based on their own personal grounds that the episteme can be questioned or reaffirmed. This calls for management to encourage a greater tolerance amongst employees.

The social dimension of knowledge was also apparent in the sense that; how I know what I know, became an identification issue. The knowledge of who could resolve a problem was construed as a valuable tool. This construction based on a limited premise that there is a right answer that somebody knows the answer that we will understand the



answer and it will fit in my situation (Dixon, 1999). An intentional effort is demanded when attempting to resolve matters for oneself (Dixon, 1999). We are a society that seeks to use knowledge to reduce the demands placed upon us, referred to by Boisot (1998) as entropy production.

In conclusion, a personal and social examination of grounds for knowledge are a valuable tool as excluding one or other would not represent the way we live and work. An overemphasis on personal knowledge is misguided.

### **Communities of knowing**

The findings revealed constructions are shared or understood within a functionally organised domain and across domains even in a small firm. The communities of knowing appear to share similar aspects in their warranting. An employee may find themselves belonging to more than one community. Alternatively, an employee may discover they have no commonality or sociality within the entire small firm. In the context of knowledge construction what matters to a community can be different to any other community in the firm. Weak ties across communities can encourage the testing of new constructs but strong ties could result in stagnation (Hansen, 1999).

Identification of the communities of knowing in a small firm may provide a valuable insight and productive management tool.

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## Artifacts

The research question asked where artifacts fit in knowledge epistemology. It was prompted by the deluge of information and communication technology to store and transfer what is known in various formats. Some software programme marketing claiming to actually manage the knowledge in the organisation. This increase in data storage has provided an element of control and dissemination. It has also demanded an adjustment in work practices and abilities (Martin and Matlay, 2003). The case scenario provided little common access to computers thus what had been gathered and input was only seen by a token number of employees. This apparent low level of computer led knowledge storage and dissemination was notable. However, increasing levels of storage or widening access would not alone create a satisfactory knowledge paradigm. Participants clearly had concern for the demands placed upon them by any artifact, whether a technical manual or a computerised job sheet. This study concludes that unless employees choose to access a storage facility, that is, they anticipate some benefit in access and anticipate the engagement as warranting their knowledge, creating one becomes futile. Management and employee need to reflect on their engagement with an artifact before full utility can be assured.

Too often literacy amongst adults is presumed. The company highlighted a low level of literacy that would prevent the useful expansion of explicit knowledge. Management had attempted to resource literacy courses but were restrained due to budgets and other priorities. Nonaka and Takeuchi (1995) deny knowledge can be warranted and taught



through manuals, books or lectures as this is only partially contributing to knowledge processes. However, this study suggests that employees incapable of participating in such knowledge processes view manuals, books, journals and so on as exclusive. Published books were recognised as a reliable source in any knowledge acquisition process and superior to computers. The social construction of published printed works as 'fact' was upheld in the case company.

Nonaka and Takeuchi (1995) recommended in-house book or article publication as an efficient means of creating a knowledge intensive culture. The level of written communication in this small firm was low and the possibility of employees contributing to a library of personal accounts appeared unlikely. Constructs of trust and reliability were linked to the production of in-house knowledge artifacts; it was unfortunate that there appeared so few. This again supports the findings of Garud and Rappa (1994) who found artifacts created by employees supported employees' belief systems.

This investigation suggests that our manner of knowing (Spender and Grant, 1996) has far more to do with the people we work with than available explicit forms of knowledge. The utility of artifacts should not be considered a priori people issues. Yet, additionally, this study concludes that it may be possible to form links between the types of grounds for knowledge used in relation to people and artifacts. Patterns of warranting began to emerge.

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## Recommendations

This examination of the construction of knowledge in a small firm has revealed knowledge warranting that involves these key themes: personal meaning, trust, capabilities, education, overlap, appropriate conditions for exchange, an external interface, communication, individual values and above all people.

This study supports the view that knowledge should not be seen in isolation from its condition of production and reproduction (Hollway, 1991). Existing management practices could be adjusted to promote attention to employee's knowledge episteme but the process is unlikely to be successful if applied verbatim from a prescriptive management toolbox. Organisations, regardless of size or sector will need to tailor their approach according to the bounded context accounting for their organic communities.

This study suggests that opportunities to develop knowledge require situations that encourage knowledge assessment and a questioning approach. Without room to experiment knowledge becomes staid. Without external stimulation knowledge becomes bounded by an internal comfort zone.

In a small firm, the manner of knowing for management and employees may be constrained due to numbers employed therefore it is stressed wider collaborative activity with material suppliers, customers, new markets and professional advisors/services is essential in order to experiment with different ways of knowing. Developing close bonds between parties will encourage trust and openness helping to evaluate the grounds for knowledge used in their alternative knowledge appropriation.

Small firm management and employees are constrained and pressurised and therefore recommending the setting of time aside for reflective practice can be difficult. Nevertheless reflective practice has been identified as a component of knowing (Tsoukas and Vladimirou, 2001), and this requires greater support in terms of planning and time allocation if knowledge development and understanding is to be achieved.



Knowledge is applicable to all employees regardless of status or position and our ways of knowing will be reinforced by practice throughout their lives. Employees may appear to use limited means of knowing in their working environment but are expert in alternative areas. Perhaps we should question why this arises and what warranting can be supported in the work place that contributes to a knowledge based view of the firm (Spender, 1996).

Management may consider the qualities and characteristics of a knowledge icon and make comparisons between themselves, their employees and the warranting of an icon. Employers cannot presume all employees are proficient in the art of knowing. Likewise the owner manager or senior management may be pivotal in leading the organisation but not essentially iconic in terms of the knowledge warranting. Employers are not seen to be charged with the responsibility of improving employees' social skills but certain skills, for example coping with change and innovativeness can be developed in the work environment and may contribute to alternative ways of knowing for all.

Small firms employ individuals with few or no formal qualifications. Management should ensure employees are not excluded from furthering their knowledge due to poor key skills, that is, verbal and written communication. In addition, employees should not be excluded due to low self esteem and a sense of inequality.

Small firms need not invest in a specific knowledge management programme when initially much can be gained from simply appreciating how employees know what they know. However, it is essential that individuality is not lost in the push for control. Amongst the constructions elicited from individual participants in the case company were some original alternatives. Alternatives provided by employees may thus offer new and valuable options.

This study suggests that unearthing any isolated meaning may prove beneficial. Therefore, management should consider processes that encourage openness and trust allowing new constructs to be voiced rather than smothered by conformity. Small firm

management may consider meta-dialogue as a means of opening discourse (Bhatt, 2000). Management need to develop employees' sense of ease and tolerance in relation to knowledge, as noted by Hutcheon (1992) amongst research students.

Knowledge is related to an individual and a community's view of reality and we need to know more about the multifarious realities that are held in the workplace and the organic work community to help to reinforce those constructs. Further work is needed to examine the concept of communities of knowing.

Management are not asking employees: How do you know? Why is this the case? These answers would be rewarding to a knowledge ethos. This study recommends that small firm management should seriously consider input from the philosophical expertise available in academia. The latter domain has vast experience and recognised systems for exposing and sharing epistemology. Knowledge in organisations needs to be underpinned by greater philosophical debate in relation to organisations.

Subsequently, academia could be pro-active in promoting their knowledge of ways of knowing and market this ability to the world of commerce. The research divisions within university faculties linked to business and management would be well placed to bridge this divide between philosophic and academic debate.

In terms of the conclusions drawn from this study it is recommended that managers of small firms review the range, production of and access to artifacts aiding knowledge appropriation. Clearly, this begins by ensuring all employees have the ability to read and comprehend literature and have the necessary skills to use, for example, a computer, telephone, and other types of media technology and presentation tools. Then, consider the preferences in engagement with particular artifacts and look to overcome fears or misgivings that constrain the employee in making full use of available artifacts. Additionally, it is recommended that small firm management seek to broaden the range of artifacts available with an emphasis on external perspectives. Furthermore, all



employees should be encouraged to become involved in the design, production and distribution of in-house artifacts.

This work recommends that business research turns its attention to grounds for knowledge in the workplace and the management of this abstract notion of knowledge.

## **Review of research process and methodology**

The research was conducted under exacting conditions but still suffers certain weaknesses that only hindsight can reveal. Between the pilot study and the main case the researcher became better acquainted with both software and hardware capabilities. When contacting possible case company participants it was envisaged that a laptop and immediate web based elicitation maybe preferable despite initial reservations as highlighted in the Methodology chapter. Yet, changes in researcher capabilities were not matched by small firm or researcher resources. Thus neither ultimate case company nor laptop was able to support a modem connection thus a delay in analysis had to be accepted. Despite the sense of a social boundary that a laptop could create it is still viewed as beneficial for participants to immediately view their component maps and cluster diagrams available via the internet based WebGrid III.

Easterby Smith et al (1996) have shown a concern for the inevitable computation of information and the restricted access to suitable repertory grid software. All lengthy projects demand computation of information and the organisation of data, this situation is not unique to repertory grid technique. The Italian web site that is run by the Oikos Association ([www.oikos.org](http://www.oikos.org)) provides an updated summary of software packages

(including freeware) together with useful references and links for followers of personal construct research methods. However, if the researcher is not concerned with correlation coefficients, regression analysis or principal components analysis then the need for software is much reduced.

The important factor remains that what is aimed for is the understanding of the personal meanings of the individual constructs, this will include the analysis. Bell (2000, p.133), the designer of G-Pack software for the analysis of grids, writes succinctly on this issue and concludes that 'the computer analysis of grids has also threatened to make the grid method itself curiously arthritic'. But then goes on to proclaim the advantages offered by computer programmes on the condition that the programme itself does not lead the inquiry. It is feasible that had the researcher continued with 'live' elicitation then the programme would have dictated much of the process and therefore it is held that a personal approach still had advantages over technology in this context.

As part of the research technique, an original intention had been to involve various employees from the case company in group elicitation. However, due to resource restraints a group elicitation could not take place. The researcher therefore utilised content analysis and Sociogrid software as an alternative, both favoured in other group PCT research. The latter are seen as alternatives but not as direct substitutes. Something was undoubtedly lost by not gathering group constructions directly from participants. It is now questionable as to whether the sociogrid truly reflects their social meaning? The results of the sociogrid are weakened by the lack of validation from participants. The



study would have benefited from a comparison between their perceptions and those devised by the sociogrid. This approach is recommended for future applications.

Looking in detail at the research instrument, a peculiarity was noted needing consideration. In respect of knowledge and people a triad of elements generated a construct set. The discriminations were noted on the grid as detailed in Methodology. One end of the grid was rated '1' and the other end '7'. When a participant was then asked to rate all elements against this discrimination occasionally a reluctance to use the '7' was noted. Yet, previously, the participant may have used the precise discrimination to label the triad. Occasionally participants felt uncomfortable with this discrimination – a sense that maybe this was going too far and would then start edging back from the '7' distinction. This never occurred when eliciting construct ratings in the context of knowledge and representations. In thinking about people some participants clearly did not wish to be seen, by the researcher, as disparaging of others. Participants were always given time to review their rating scale and never forced to commit until totally comfortable. This occasional move from the extreme in the rating scales is not seen to deter from reported findings. However, on reflection, this issue should have been explored further.

A closer fit between this study and Geertz (1973) 'rich description' would have been provided by individual self characterisation (Kelly, 1955). The self characterisations would have strengthened each cameo insight and indicated a biographic history linked to elicited constructions.

This research provides substantial support for more small firm research that involves a broader representation of employees. The research case provided twenty participants from a total employee population of thirty two. Interviewing all employees proved impractical but remained desirable.

PCT has distinct advantages for revealing how it is *at present*. There are some who would prefer to see more in relation to the history of the construct formation.

### **Opportunities for further research**

Research concerning knowledge epistemology in the workplace is still in its infancy. Many issues have evolved from this research that prompt a call for further research. It would be interesting to develop further the concept of employee as knowledge inquirer, man the scientist (Kelly, 1955) and comparing resulting descriptions with a typology of researchers drawn from Jung's (1971) collected works described in the Literature Review.

It is recognised that a research community benefits from both positivist quantitative research and qualitative depth. Researchers could consider using constructs generated from this study to conduct a considerably wider survey in either small firms or as a comparison in large firms.



In upholding the case for intense examination of the particular, even in small firm business research, it would be enlightening to explore further the concept of communities of knowing. How are they created and used and how do they function? An ideal domain of action to launch this approach would be in academia where communities are perhaps more obvious and active.

There is still much to be investigated, for example, effects of race, gender, nationality and religion on grounds for knowledge in a commercial context. We need to see more research in relation to firms where knowledge management processes have been attempted. These are exciting and valuable notions to explore that precede a prescriptive approach to managing what is known.

Further research based on repertory grid in a business context is appropriate. This study has used a combination of manual and software applications of repertory grid. An interesting study could compare the constructions gained from a purely manual application with a complete adherence to WebGrid III.

### **Concluding Remarks and final thoughts**

Looking back over the work it is essential that a clear contribution can be justified. What are the significant outcomes that really matter? A research question that featured fundamental philosophical debate appeared an ambitious project when epistemological discourse is commonly linked to a specialist field and an academic context. There had

been little attention on current philosophical thought in commerce or anywhere outside a distinguished domain (Brown and Duguid, 2000).

Emphasising the central position of people over and above artifacts in knowledge warranting is a useful concept and one that could be used to rethink knowledge in organisations both large and small. In addition highlighting the relevance of socially constructed knowledge may impact on the manner in which management should approach an organisational knowledge paradigm. *He/she knows* because they are getting on with work *with them*. In addition '*them*' refers to everyone in a company. It is significant that this study valued all participants and all participants were in a state of knowing something. How they knew that something was and is relevant.

Research in small firms was and remains problematic due to their operational restraints, access and sustainability. But these difficulties need to be overcome in order to further our knowledge of a vital contributor to UK economy. Research seen to involve small firms from research proposal through to meaningful outcomes will improve relations with academia. Clearly, as revealed in this study, knowledge involves a multiplicity of constructions, regardless of company size.

A decision was taken to research two dimensions: knowledge construction in the context of people and knowledge construction in the context of artifacts. One dimension would have been insufficient and incomplete. The research question wished to bring together both aspects within one study providing a unique and original approach to knowledge construction in a small manufacturing firm. Chapter 4 provided a deconstruction of



knowledge from a people and artifact perspective. Chapter 5 has partially contributed to an assembly of the construction of knowledge in a small firm and offered further opportunities to research management techniques and tools appropriate to small firms.

In summary small firm management, facing typical resource restraints need to reflect on the eclectic mix of knowledge construction in greater detail in order to support their operations. The appropriate action will not be a reduced carbon copy of large firm processes. An individual system of knowledge assessment, omitted by large firms, appears a profitable starting place. This should take the form of an investigation and exposure of knowledge warranting used by employees which may combine socially and individually construed templates across divisions and communities. Management should not feel bounded by commonality where consensus and agreement may have led to rigidity and immobility. Instead a knowledge paradigm that uncovers individual meaning and 'novelty' which may lead to pockets of individual innovation and original thought (Tsoukas and Vladimirou, 2001).

A change in management (Spender and Grant, 1996) is called for in response to an alternative knowledge based view of small firms. Employees need to learn to experience in order that experience will equal learning. A drive for activity has thwarted employees' attempts to be contemplative. We have become an active society rather than a thinking society. By furthering this interest in knowledge in organisations it may be feasible to promote the concept of how we know and share in each others knowing.

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APPENDICES

Appendix I

Table of Jung’s (1971) Typology of research

	Analytical Scientist	Conceptual Theorist	Conceptual Humanist	Particular Humanist
Nature of scientific knowledge	Impersonal, value-free, disinterested, precise, reliable, accurate, valid, reductionist, causal, apolitical, cumulative, progressive, clear standards for judgement, realistic, anti- mystical, unambiguous, exact.	Impersonal, value-free, disinterested, holistic, valid, apolitical, imaginative, multi- causation, purposeful ambiguity, uncertainty, problematic.	Personal, value- constituted, interested activity; holistic; political; imaginative; multiple- causation; uncertain; problematic; concerned with humanity.	Personal, value- constituted, interested; partisan activity; poetic, political, action- oriented; acausal, non- rational.
Guarantors of scientific knowledge	Consensus, agreement, reliability, external validity, rigour, controlled nature of inquiry, maintenance of distance between scientist and objects studied	Conflict between antithetical imaginative theories, comprehensiv e holistic theories, ever- expanding research	Human conflict between knowing agent and subject known; inquiry fosters human growth and development	Intense personal knowledge and experience

## Appendix II

**Table 8 The eleven corollaries supporting Personal Construct Theory (Kelly, 1955)**

Choice	Persons choose for themselves that alternative in a dichotomised construct through which they anticipate the greater possibility for the elaboration of their system
Commonality	To the extent that one person employs a construction of experience which is similar to that employed by another, their processes are psychologically similar to those of the other person
Construction	A person anticipates events by construing their replications
Dichotomy	A person's construction system is composed of a finite number of dichotomous constructs
Experience	A persons construction system varies as they successively construe the replication of events
Fragmentation	A person may successively employ a variety of construction systems which implicate incompatibility, that is, appear to contradict each other
Modulation	Accounts for the change in the construct system limited by the permeability of the constructs within whose range the variation presents itself
Organisation	The constructs are structured within a hierarchical system with superordinate constructs setting the context of subordinate constructs.
Range	Just as PCT has a focus and a range of convenience so too the constructs of our own system. Kelly (1955) gives the example of the construct tall v short. It is possible to consider tall or short people or tall and short trees but the construct has little to offer in respect of the weather. Kelly saw the original focus of PCT being in stress management and its range that of human personality and interpersonal relationships. Over time this range has successfully expanded to incorporate new research areas, for example, person perception, learning, language, politics and change management.
Individuality	Persons differ from each other in their construction of events
Sociality	To the extent that one person construes the construction processes of another, they may play a role in a social process involving the other person



## Appendix III

### Small firm Invitation Letter

5<sup>th</sup> June 2000

Mr A  
Managing Director  
ABC Ltd  
Address 1  
Address 2  
Address3

Dear

I am writing to introduce the pioneering work of the Centre for Small Business Research and Development situated within the Business School at De Montfort University. Dr Peter Wyer who has gained considerable recognition for adopting an intensive exploration policy in contrast to mass survey questionnaires heads the Centre. The research has focused on the strategy and structure of Small to Medium Sized Enterprises (SMEs) and in particular the internationalisation of this sector. We have previously completed valuable case studies and insight in Malaysia, Germany and Russia.

The work now wishes to concentrate on UK small firms. I am currently looking for a firm that considers itself sustainable and with a keen interest in understanding knowledge concepts in their firm. The research aim is to enhance understanding as to the construction of knowledge internal and external the small firm in the automotive component sector. Unfortunately, the use of the term 'knowledge' has been much abused by the media and is in danger of being positioned alongside other business jargon such as "mission statement" or "the learning organisation". However, I am sure you will agree that 'knowledge' and its 'management' deserves serious consideration in the changeable, vulnerable automotive sector.

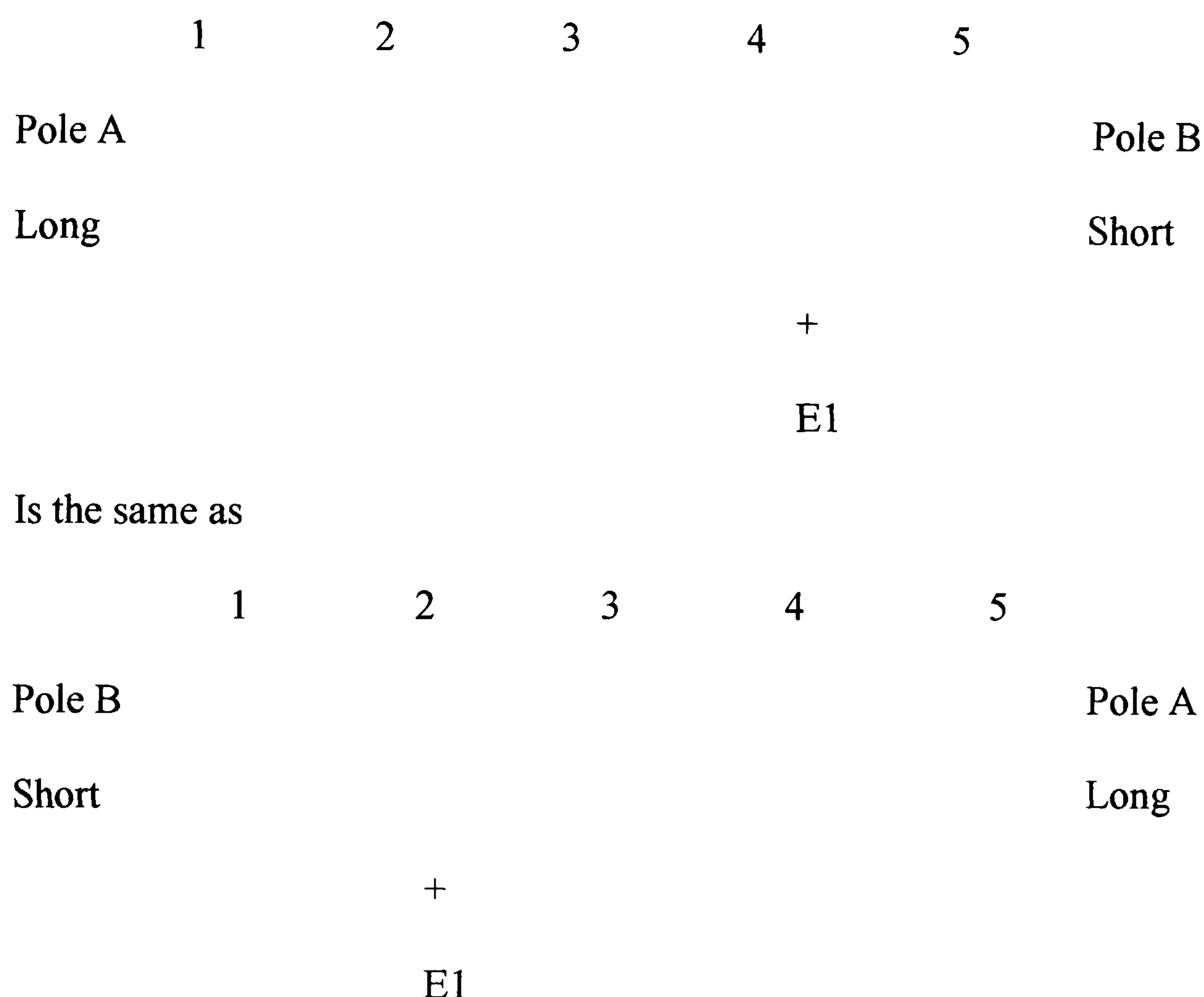
In return for your involvement in the research project the Centre would be happy to discuss consultancy or training work in a sector/s of your choice e.g. marketing, human resources, accountancy, law, strategy, learning and development, etc.

If, .....is able to participate in this research we would be delighted to hear from you. I shall be conducting interviews throughout the summer and successful participants will be notified of their application by September 2000. The field research will take place throughout 2001.

Yours sincerely

**FOCUS hierarchically clusters elements and constructs within a sub-domain (Shaw, 1980)**

Constructs are bipolar. That means that a construct can be thought of as a line or dimension along which each element has a place in relation to all the other elements, and the construct can be looked at either way round.  
E.g. for a 5 point rating scale



Element E1 is still between the middle of the pole and pole B. We need to look for the two constructs which are most highly matched, but because of the bi-polar nature of a construct a complete mismatch or negative match is as significant as a complete positive match. To ensure the best match is found, all the constructs are included twice, once with the poles and the ratings reversed and the actual choice of the original or reversed form is made at the time of incorporation into a cluster. The clusters are formed by successively choosing the pair of constructs, which are most highly matched (Shaw, 1980 page 170)

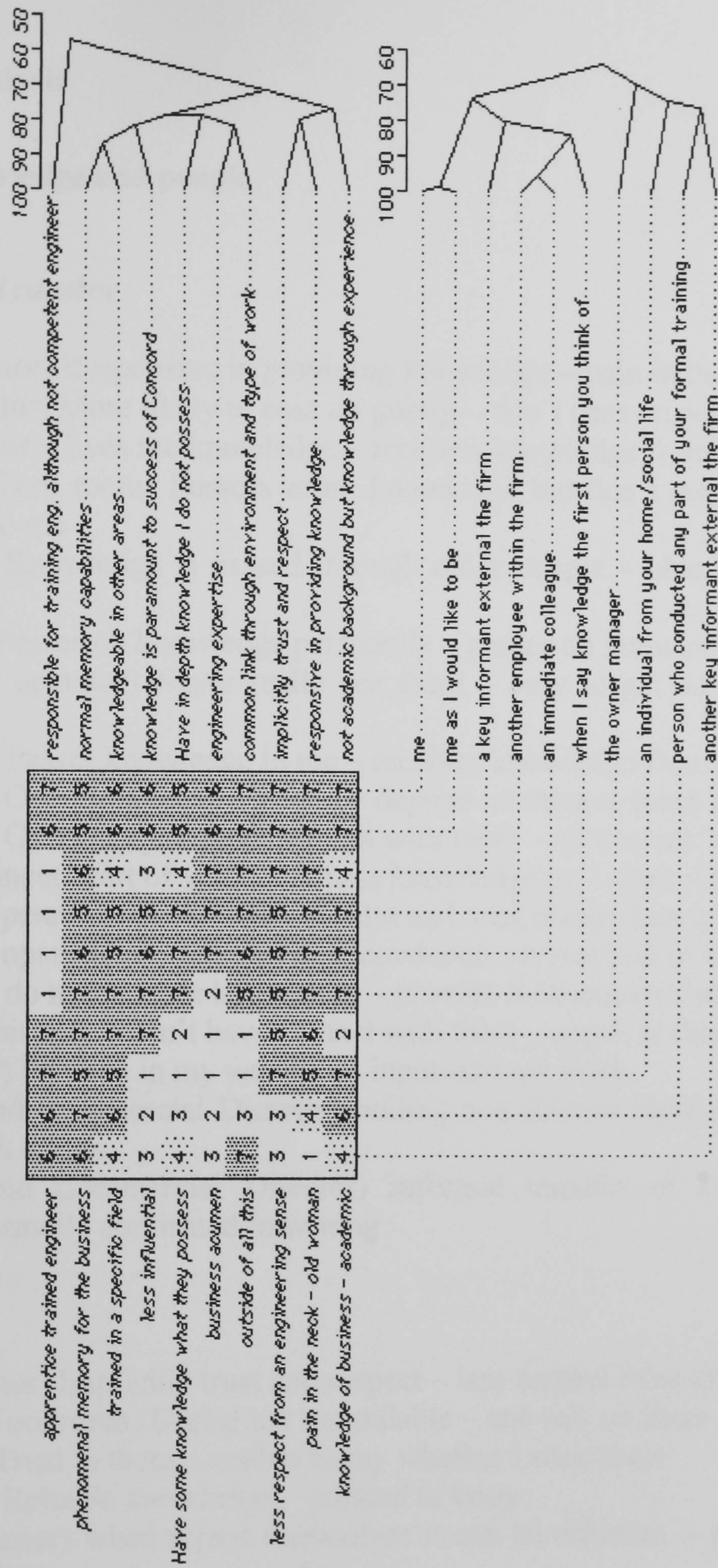


Appendix V

Participant 1 Web Grid III output – display of completed grids

knowledgeable in other areas	1	2	3	3	4	4	3	1	2	2	trained in a specific field
apprentice trained engineer	1	6	1	1	1	6	7	7	7	6	responsible for training eng. although not competent engineer
not academic background but knowledge through experience	1	2	1	1	4	4	1	6	1	1	knowledge of business - academic
Have in depth knowledge I do not possess	1	5	1	1	4	4	7	6	3	3	Have some knowledge what they possess
common link through environment and type of work	3	5	2	1	1	1	7	7	1	1	outside of all this
engineering expertise	6	6	1	1	1	5	7	7	2	2	business acumen
responsive in providing knowledge	1	4	1	1	1	7	3	2	1	1	pain in the neck - old woman
normal memory capabilities	1	1	2	3	2	2	3	1	3	3	phenomenal memory for the business
knowledge is paramount to success of Concord	1	6	2	3	5	5	7	1	2	2	less influential
implicitly trust and respect	3	5	3	3	1	5	1	3	1	1	less respect from an engineering sense
											me as I would like to be
											me
											the owner manager
											an individual from your home/social life
											another key informant external the firm
											a key informant external the firm
											another employee within the firm
											an immediate colleague
											person who conducted any part of your formal training
											when I say knowledge the first person you think of







## Appendix VI

### Content Analysis

#### Part A Knowledge and people

##### Knowledge Transfer

(Works Director) Responsive in providing knowledge – pain in the neck (old woman)  
 (Setter Operator) More likely to pass on gossip – don't pass on gossip  
 (Press Operator) Gives me knowledge – receives knowledge from others  
 (Apprentice Tool room) Possess more knowledge but don't see them – knowledge is more useful to me  
 (Tool setter) Knowledge is passed through other people – able to pass on knowledge first hand  
 (Tool setter) Passes on knowledge personally – passes on knowledge via media  
 (Power press operator) Never really see them – easy to get on with so pass on their knowledge  
 (Tool maker) Passes knowledge to me – receives knowledge from me  
 (Power Press Operator) pass on gossip – depend on them to teach me  
 (Power Press Operator) just have a laugh with them – able to talk seriously with  
 (Quality Engineer) part of work is to pass knowledge on – their job is to listen  
 (Tool setter operator) open to help – bit hit and miss about sharing what they know  
 (Power press operator) do not provide knowledge – a provider of knowledge  
 (Mig welder) do not provide knowledge – provide information that you need  
 (Office administrator) don't have contact with them – speak to them  
 (Book keeper) help me in my work – no input into my work  
 (Technical and Commercial Director) willing and able to share – not as gregarious at sharing it with others  
 (Technical and Commercial Director) informal transfer of knowledge – pass on knowledge formally confirmed in writing

##### Value Issues

(Works Director) Implicitly trust and respect – less respect from an engineering sense  
 (Apprentice Tool room) Useful but not reliable – can rely on them  
 (Tool setter) Trust in them – unable to say whether I trust them  
 (Tool maker) Reliable knowledge – pretend to know  
 (Quality Engineer) when repeat themselves it can be different – say something and the next day it's the same  
 (Power Press Operator) cannot see it happen – in front of you so believe it  
 (Personnel controller) not as informed and less trust – trust them  
 (Personnel controller) reason things out more – blinkered, can't always see  
 (Despatch and goods inwards) doubtful – certain until tested  
 (Book keeper) don't elaborate – have to tell lies sometimes

(Book keeper) two faced – knowledge passed on the same way regardless  
 (Technical and Commercial Director) thinks he knows what he is talking about – actually knows what he is talking about  
 (Technical and Commercial Director) open minded – tell them once and they are the expert

### **Experience and Age**

(Apprentice Tool room) Younger – more experienced  
 (Apprentice Tool room) Have experienced less – more knowledge ‘cos of what they do everyday  
 (Apprentice Tool room) Younger people – a lot older  
 (Apprentice Tool room) Have experienced less – because of position wiser  
 (Shop supervisor/Maintenance engineer) Younger people so less knowledge – have knowledge because of age  
 (Power Press Operator) have not done much in life – have done a lot so know more  
 (Power Press Operator) knowledge is limited due to time , age – more knowledge because of length of time, age  
 (Mig welder) young person so not so knowledgeable – wiser older person  
 (Tool setter operator) not had years of experience – knowledge from years of experience  
 (Power press operator) not having experience – having experience  
 (Personnel controller) had life experiences – younger not had life experiences  
 (Personnel controller) inexperienced – in depth knowledge of your own job  
 (Technical and Commercial Director) less experienced but learning – knowledge picked up by experience

### **Specialised Knowledge**

(Works Director) Engineering expertise – business acumen  
 (Press Operator) Very special knowledge – limited knowledge  
 (Press Operator) Knowledge about press work – has no knowledge about press work  
 (Shop supervisor/Maintenance engineer) Have specialised knowledge – specialised knowledge not in this field  
 (Shop supervisor/Maintenance engineer) Loose general knowledge – depth of knowledge  
 (Shop supervisor/Maintenance engineer) Engineering knowledge – broad knowledge  
 (Tool setter) Knowledge relates to engineering trade – knowledge is worldlier  
 (Tool setter) Knowledge relates to my job – has knowledge don't come across in Concord  
 (Power Press Operator) possess knowledge other than engineering – have engineering knowledge  
 (Tool setter operator) knowledge on one subject – knowledge accumulated over years in various subjects  
 (office administrator) wide range of knowledge – just computer knowledge  
 (Book keeper) factory based knowledge – office based knowledge



## Academia and Education

Works Director) Not academic background but knowledge through experience – knowledge of business (academic)  
 (Press Operator) Attended university – done a lot of training  
 (Tool setter) Knowledge comes from secondary modern and their mates – university  
 (Power press operator) Education – lack an education  
 (Power press operator) Not enough school – had more schooling  
 (Power Press Operator) taught me something – taught me all I know  
 (Quality Engineer) school/college – school was not so important, not pushed  
 (Tool setter operator) have not gone to university – gone to university  
 (Power press operator) not taught as much – clever people because they have been taught  
 (Personnel controller) average education – “better” educated  
 (office administrator) trained more with skills at work – probably brought up with university background  
 (Technical and Commercial Director) a lot more academic training – not as academic

## Intelligence and Cleverness

(Setter Operator) Less wise – wiser  
 (Press Operator) Grafters – clever ‘cos people work for him  
 (Press Operator) Not as clever as the owner – very clever  
 (Tool setter) Clever in their own way – more knowledge about general things, a clever clogs  
 (Power press operator) Able to take things in – struggle with taking things in  
 (Power Press Operator) don’t know a lot – quite brainy  
 (Power Press Operator) knows a lot of people – knows a lot of intelligent people  
 (Mig welder) more clever – not so clever  
 (Book keeper) not daft – a lot more intelligent

## Discovery and Creativity

(Setter Operator) Possibly not discovered as much – discovered a lot  
 (Tool maker) Not been creative with knowledge – used brains to create something  
 (Power Press Operator) not an inventor – inventor  
 (Power Press Operator) experiment – willing to experiment more  
 (Power Press Operator) less potential with their knowledge – use knowledge to make money  
 (Power press operators) know how to work things – know how to set things up  
 (Power press operator) use their knowledge to do things – use their knowledge to acquire things  
 (Despatch and goods inwards) going in blind, experiment – repetition proves their knowledge

## Knowledge and Power

(Setter Operator) More down to earth – know everything about running a firm  
 (Apprentice Tool room) Not renowned for their knowledge – famous for their knowledge  
 (Apprentice Tool room) Not recognised – Knowledge is shown by their success  
 (Tool setter) Don't have the power – will always have final say whether right or wrong  
 (Tool maker) Learning from others – knowledge is superior, set apart  
 (Quality Engineer) of average intelligence – role in life indicates their knowledge  
 (Tool setter operator) not in that position – confident what they say is right because of position

## Able to communicate

(Tool setter) Communicate regularly – communicate less about the work itself  
 (Power press operator) beat around the bush – comes straight to the point  
 (Personnel controller) less open – open and communicate  
 (despatch and goods inwards) communicate verbally – communication in written form  
 (book keeper) slow about getting to the point – forthcoming straight to the point  
 (Book keeper) always searching for the right word – very good communicator

## It's who you know not what you know

(Works Director) Have in-depth knowledge I do not possess – have some knowledge what they possess  
 (Shop supervisor/Maintenance engineer) Tap into their knowledge – knows a man who can , not an expert themselves  
 (Power press operator) Knowledge has become social – knowledge starts from within  
 (Mig welder) its how much they know – it's who they know  
 (Mig welder) do not know the right people – know the right people to obtain what they need  
 (Despatch and goods inwards) do not know what owner manager knows – should know all what others know



## **Opportunities/chances**

(Power Press Operator) let the world slip by – take chances, opportunities  
 (Tool setter operator) unlimited chances – limited by parents attitude/class  
 (Power press operator) don't use the chances they have – better start in life  
 (Personnel controller) socially deprived, under-privileged – privileged, different strata of society  
 (Book keeper) not the family support – family orientated  
 (Technical and Commercial Director) circumstances dictate knowledge, less opportunity – opportunities

## **Training and Instructing**

(Works Director) Knowledgeable in other areas – trained in a specific field  
 (Works Director) Apprentice trained engineer – responsible for training engineers  
 ( although not competent engineer)  
 (Quality Engineer) have not been trained to stand up and present – trained to present  
 (Tool setter operator) a lack of training – experienced more training  
 (despatch and goods inwards) they are instructed – they are the instructor  
 (Book keeper) not so formal training – lot more training

## **Managerial Knowledge**

(Shop supervisor/Maintenance engineer) Managerial knowledge – no managerial knowledge  
 (Quality Engineer) management knowledge – other responsibilities  
 (Power Press Operator) no management knowledge – management knowledge  
 (Mig welder) no management knowledge – management knowledge  
 (office administrator) less knowledge of management – knowledge of management

## **The Need for Knowledge**

(Setter Operator) Only take in what they want to know – knowledge is vast  
 (Power press operator) Knowledge has stayed the same – built themselves up in their work  
 (Tool maker) Happy where they are with knowledge – want to gain knowledge  
 (despatch and goods inwards) reached a scale to instruct a large number of people – still aim for a higher level of knowledge  
 (Technical and Commercial Director) stayed in the same role – re-trained to take on another role

## **Confidence**

(Shop supervisor/Maintenance engineer) Weak character so less convincing – strong character affects knowledge transfer

(Power press operator) Confident – knowledge restricted through lack of confidence

(Personnel controller) not as sociable, introvert – sociable

(Quality Engineer) have not got this ability to present – presents it so you accept it as fact

(Power Press Operator) nervous about getting the knowledge – confident

## **Learning**

(Setter Operator) Knowledge is passed on – still learning

(Press Operator) Learns from watching – learns from other methods

(Power press operator) learning by mistakes is not how they learn – learning by mistakes

(despatch and goods inwards) still learning – knows what he is talking about, studied

(despatch and goods inwards) never learn – learn from mistakes

## **Internal and External Knowledge**

(Works Director) Common link through environment and type of work – outside of all this

(Setter Operator) Has knowledge from outside the firm – knowledge is mainly work

(office administrator) deal with the public – deal with things in-house

(office administrator) knowledge in-house– has to keep up with knowledge of the real world

## **Knowledge as quantifiable**

(Press Operator) Has more knowledge – has less knowledge

(Apprentice Tool room) Knows less – knows more

(Power press operator) Knows less – knows more

## **The importance of knowledge**

(Works Director) Knowledge is paramount to success of Company – less influential

(Mig welder) into the office work – a vital part of Company

(despatch and goods inwards) knowledge supports dependants – knowledge supports lives of others



**Life knowledge**

(Tool maker) No contribution to life knowledge – provider of life knowledge

(Mig welder) knowledge is something to do with work and quality – knowledge is about growing up and becoming independent

**Knowledge is time related**

(Tool maker) Current work knowledge – historical

(Tool maker) Knowledge makes a difference now and in the past – knowledge that made a difference

## Content Analysis

### Part B Knowledge and representations

#### Demands on the Individual

(Works Director) visual – have to sit down and read it  
 (Works Director) requires a lot of concentration – less intensive  
 (Works Director) have to commit time to the medium – can get up and walk away  
 (Setter operator) Direct information – have to pick it up and read it  
 (Setter operator) Concentrate more when it is in front of me – get distracted from it  
 (Setter operator) take less in – take more in from something like a book  
 (Press operator) got to read it – shows you  
 (Press operator) not visual – can see what's happening  
 (Press operator) reading – listening  
 (Press operator) it's up to you – have to read them everyday  
 (Press operator) less enjoyable to use – find it enjoyable  
 (Press operator) have to watch it – enjoy reading this  
 (Apprentice Tool room) boring - interesting  
 (Quality engineer) requires you to do something – can sit and watch  
 (Press operator) written form – comes up on the screen  
 (Office administrator) harder to access – ease of access  
 (Despatch and goods inwards) written – not a written document  
 (Tech and Commercial Director) need to plough through to get what you want – ease of accessibility

#### Range

(Works Director) vast array and variety of knowledge – specific data  
 (Press Operator) limited – contains vast knowledge  
 (Press Operator) can't show you – covers the whole picture  
 (Tool setter) limited information – gives more information  
 (Press Operator) just a company thing – provides information from everywhere  
 (Toolmaker) more specific – gives information on everything  
 (Toolmaker) possesses a great quantity of knowledge – a reduced quantity  
 (Toolmaker) limited use – the place you can go to find everything  
 (Power Press Operator) Its what is happening in the company – what's happening in the world  
 (Office administrator) limited in the knowledge they provide – more wide range  
 (Office administrator) information on many subjects – information on one subject  
 (Despatch and Goods Inwards) covers a certain area – covers everything  
 (Book keeper) internal information – external information  
 (Tech and Commercial Director) a more global view – solves a specific problem



## **Inclusion/involvement**

(Works Director) knowledge accessible via personal contact – impersonal  
 (Apprentice Tool room) make your own mind up – reading/seeing someone else's opinion  
 (Apprentice Tool room) less involved – you're more involved  
 (Quality engineer) easy access – hidden away  
 (Tool setter) use personally – use it through somebody else  
 (Shop supervisor) general anyone can gain knowledge from them – personal not accessible  
 (Shop supervisor) limited access – totally accessible  
 (Press Operator) it's just you – it involves somebody else  
 (Press Operator) stays the same – add my knowledge to it (contribute)  
 (Office administrator) include everyone – addressed to a certain person  
 (Book keeper) applies to a few people - applies to everybody  
 (Book keeper) not involved in creation – you have input  
 (Tech and Commercial Director) acts as a confirmation – I input into it, gives ownership

## **Validity**

(Press Operator) less reliable – more reliable because word to word  
 (Apprentice Tool room) more truthful - less reliable  
 (Shop supervisor) possibility it may not be true – black and white  
 (Shop supervisor) not as positive – can't change so more truthful  
 (Toolmaker) not always accurate – when you find information you can rely on it  
 (Press operator) I would believe it – don't believe it at all  
 (Quality engineer) not produced by our company people – somebody in the company has drawn it up so must be fact  
 (Tool setter operator) have been researched – not always accurate  
 (Tool setter operator) less certain they are right – more certain they are right  
 (Tech and Commercial Director) robust – flaws in the system

## **Time related**

(Works Director) real time observation – historical data  
 (Setter operator) supply up to the minute news – only supply what has been previously stored  
 (Tool setter) can be from the past – gives what is actually happening  
 (Office administrator) past knowledge – up to date  
 (Despatch and Goods inwards) knowledge of what has been done – what you have to do  
 (Despatch and Goods inwards) currently working on – an overall picture of what can be done  
 (Tech and Commercial Director) out of date aged – up to date, the latest

**Communication**

(Works Director) A means of immediate communication – a reference tool

(Setter Operator) pass on information and let you know – also pass on information but it is hard to explain how

(Shop supervisor) Two way transfer – one way transfer

(Power press operator) use the information yourself – use it to pass on information

(Power press operator) does not react - communicating

**Process Involved**

(Quality engineer) Not sufficiently trained to use – can follow step by step

(Tool setter) just supply knowledge – have a purpose beyond supplying knowledge

(Tool setter) pick it up quicker – not familiar with it

(Toolmaker) Process is not new – get knowledge and the process itself adds to knowledge

**Format**

(Works Director) electronic data – hard copy data

(Book keeper) it is in hard copy format – can lose it